BCOG-171
Principles of
Micro Economics

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THE PEOPLE'S
UNIVERSITY

School of Management Studies

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BLOCK 1

FUNDAMENTAL PROBLEMS OF ECONOMIC SYSTEM AND BASIC CONCEPTS

BLOCK 1 FUNDAMENTAL PROBLEMS OF ECONOMIC SYSTEM AND BASIC CONCEPTS

To find appropriate solutions to the present day complex business problems, personal experience, intuition, insight, foresight, judgement, etc., are no longer adequate. The economic reasoning and tools of analysis are very essential in arriving at an optimum solution to business problems. Being a Commerce student, therefore, it is essential for you to have at least a working knowledge of the relevant economic theory. This Course on Economic Theory has been designed essentially to fulfil this requirement. This is an introductory block on Economic Theory. The main focus in this block is to build some foundations for your study of micro economics. This includes the fundamental questions and problems faced by every economy, the basic economic terms and concepts, and the various economic systems found in different countries.

This block consists of two units.

Unit 1 describes the meaning of an economic system, fundamental problems of an economy, and the nature of resource allocation in different types of economic systems. It also discusses the meaning and features of various factors of production

Unit 2 discusses some basic economic laws, concepts and terminology. It also explains how different parts of the economic system are interdependent.

UNIT 1   FUNDAMENTAL PROBLEMS OF ECONOMIC SYSTEMS

Structure

1.0   OBJECTIVES

After studying this unit, you should be able to:

- explain the problem of scarcity of resources for satisfying ever-increasing wants of a society;

- state the meaning and nature of an economic system;

- describe the concept of economic entities;

- explain the concept of factors of production and also their main types and characteristics;

- state the source, nature and relevant details of the fundamental problems of an economy;

- describe the concept of production possibility curve;

- state the issues relating to allocation of resources between investment and consumption, and between private and public goods;

- explain the methods of resource allocation in a market economy, a socialist economy and a mixed economy.

1.1   INTRODUCTION

In this introductory unit, you would be introduced to some important fundamental questions and problems faced by every economy. A familiarity with them would help you in understanding economic reasoning and theories based upon that reasoning. It would also become easier for you to understand the nature of problems which an economy faces and the type of solutions for resolving such problems. In this unit, you will study in detail the meaning of an economic system or an economy, fundamental problems of an economy, meaning and characteristic features of factors production, the concept of production possibility curve, and the nature of resource allocation indifferent types of economic systems.

1.2   AN ECONOMIC SYSTEM

Before we discuss the fundamental concepts, questions and problems faced by every economy, let us first know the meaning and nature of an economic system.

1.2.1   Concept of Scarcity

"Scarcity" lies at the root of all economic activity. The concept of scarcity finds an expression in two basic facts of economic life, as follows.

A.   Unlimited wants or ends, and

B.   Scarce resources or means.

A.   UNLIMITED WANTS OR ENDS

Every person has some wants. If they are not satisfied, the person concerned feels a 'pain' which may be physical or psychological or both. If, on the other hand, a want is satisfied, the feeling of 'pain' is replaced by that of 'satisfaction' or 'fulfilment'. This fact urges every human being to satisfy his wants. Some people try to reduce their wants, but even such persons make an effort to satisfy their wants, however limited they may be. You should note that different persons have generally different wants, and wants of even the same person keep changing with the

passage of time, change of place and status. This is because wants of a person depend upon a number of factors. Such factors differ from person to person and also over time. They include his physical health, his ideas and attitudes, the society he belongs to, the place he lives in the season of the year, and so on. Wants of a person also change with the change in his/her income.

Human wants have certain characteristics and you should make note of them for understanding the nature of an economic system. One such characteristic is that many of the human wants cannot be satisfied permanently. We say that these wants 'recur'. When such a want is satisfied, it emerges again and has to be satisfied repeatedly. For example, a person can satisfy his hunger by consuming food, but he becomes hungry again after some time and needs food to satisfy it. Another characteristic of human wants is that new wants keep coming up. That is to say, as some wants are satisfied, new ones take their place.

These two characteristics of wants, namely, i) recurrence of wants satisfied earlier, and (ii) emergence of new wants, mean that human **wants are unlimited and keep increasing**. Human beings have a constant urge to improve their standard of living and to explore the unknown. They feel like trying new things. Also an ever changing state of affairs keep creating new wants.

You should note the fact that satisfaction of a want requires the use of some goods or services, called 'means' of satisfaction. Any specific want may be satisfied by various means. Similarly, a specific mean may be usable to satisfy various wants. For our purpose, however, a more significant basic fact is that the available goods and services are never sufficient to satisfy all our recurring and ever-increasing wants.

Each of the following goods cost Rs. 100. You have one hundred rupee note with you.

1. A ticket to a PVR movie
2. A fiction
3. A text-book on Economics
4. A big chocolate for your friend.

How will you spend your money?

Find out your Priorities if:

a) All of your friends in your friend - circle have the same priority.

b) Your priorities remain the same always.

B. SCARCE MEANS OR RESOURCES

Fulfillment of wants requires resources (or the means to satisfy wants). Availability of resources is limited in relation to requirements. This basic fact is common to all individuals, all groups and all societies; howsoever rich a person or an economy may be it cannot free itself from the grip of scarcity.

Scarcity is a situation in which the available resources fall short of requirements. (This may be with reference to an individual or a group of individuals; an economy or a group of economies called GLOBAL ECONOMY).

ASK

Mukesh Ambani

or

Bill Gates

or

George Soros

Have they overcome scarcity?

However, scarce means have alternative uses. The same person can work on writing a software solution or preparing guidelines for executives. He can do one job, not both, because of the scarcity of time.

You have budgeted 3 hours of your time each day for relaxation and leisure. A few of the options available to you are:

- Spend it with your friend

- Watch a movie.

- Play a video-game

- Spend time on Face book, Twitter or any other social network

You may choose one or more; total time spend has to be 3 hours.

The available piece of land can be used for cultivation of cotton or setting up a factory. How to make a choice?

Available savings with your parents can be put in a fixed deposit with a bank or invested on a stock exchange. What to do?

How will you make a choice?

All these questions arise because the available resources are scarce. But all the resources have alternative uses. The ends also differ in intensity.

The resources therefore need be allocated among different uses in a systematic coordinated manner. Every individual and economy has to device a mechanism for this.

SCARCITY IS NOT THE SAME THING AS POVERTY.

POVERTY IMPLIES NON-AVAILABLITY OF RESOURCES EVEN FOR BARE SUBSISTENCE.

SCARCITY IMPLIES NON-AVAILABILITY OF RESOURCES TO FULFILL EVERY CONCEIVABLE DESIRE

"A POOR PERSON SUFFERS FROM BOTH POVERTY AND SCARCITY

A RICH PERSON SUFFERS ONLY FROM SCARCITY AND NOT POVERTY"

Example- Scarcity of Medicines and other medical facilities during second wave (2021) of corona pandemic

What is the way out of this scarcity? Some thinkers believe that human beings should cut their wants to meet this imbalance. But this philosophy is approved by very few persons and their thinking and behaviour hardly makes any difference to the thinking and behaviour of the society as a whole. In other words, the fact is that the society does not want to check the growth of wants. It only tries to satisfy more and more of them. And this is the basic behaviour pattern which we must accept as a reality.

Satisfaction of wants of an increasing scale requires two-fold strategy:

1) Means provided by nature are insufficient for satisfying all wants of the members of the society. Therefore, their availability must be increased in possible ways such as, by organizing production centers, by training the labour force, by improving production methods, by creating institutions like money and banking and so on.

2) You have learnt that all wants of all people cannot be satisfied. Therefore, some system has to be devised whereby more important and more urgent wants are identified out of the total and are given priority. In the other words, scarce means have to be rationed out between members of the society and their use for different wants has to be regulated. It implies that the use of resources has to be 'Economised'—which means that the resources cannot be wasted or put to less important uses.

1.2.2 An Economic System or Economy

Different societies try to solve these issues in different ways and in the process each society creates a set-up called 'an economy'. The term economy or 'economic system' is a comprehensive one. It covers the entire set-up created for meeting the basic and permanent problem of an imbalance between means and wants. Thus it includes not only the natural resources of a country, but also those which are created by man. It includes the entire arrangement relating to production, trading and exchange, transportation and

distribution of goods and services. Similarly, various institutions like currency, banking, financial assets, and markets, etc., created and maintained to meet the above said twin objectives are part of an economic system.

You would realize that in reality the composition of an economy will depend upon a number of factors. The extent of natural resources of a country, its geographical and climatic factors, its social, political and religious set-up, its past history and many other forces determine the exact form of the economy of that country. As a result, the economy of one country can substantially differ from that of another. It is for this reason that we talk of the Indian Economy as against the British Economy or the Japanese Economy. Thus, the term Indian Economy represents the totality of the set-up, institutions, arrangements which the Indian society has built up for meeting the twin objectives of

i)   increasing the availability of means to satisfy wants, and

ii) using them in the most economical manner possible. All the natural and man-made productive resources are also part of the Indian Economy.
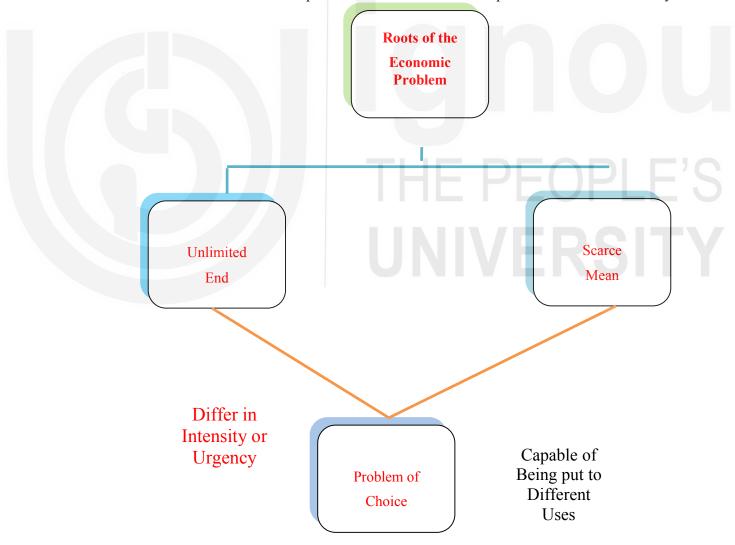

Figure 1.1: Roots of the Economic Problem

Knowledge of salient and distinguished features of an economy helps you in analysing its problems and their possible solutions. Accordingly, we also classify economies on the basis of their distinguishing features. For example, take the case of a capitalist economy. In this case, the means of production are owned and inherited by individuals, and various economic decisions are guided by prices of goods and services in the market. The income of an individual is determined by means of production supplied by him to the market and the rates at which they are paid for their service.

Another manner of distinguishing between different economies is with reference to the predominance of the type of productive resources, income and employment, etc. On this basis, an economy may be an agricultural or an industrial one. Similarly, depending upon its level of development (that is ability to produce means of satisfaction), an economy may be termed as a developed economy or an underdeveloped economy. You should also note that with the passage of time, the salient features of an economy generally undergo a change either through historical evolution or through deliberate policy measures.

Therefore, every economy has to solve the basic problem of scarcity of means of satisfaction in relation to ever increasing wants. The means and wants can be combined in alternative ways. The problem of scarcity exists whether an economy is developed or underdeveloped. Hence, it has to address itself to two issues:

1) increasing the availability of means of satisfaction, and

2) laying down the priorities of the wants to be satisfied.

1.2.3 Economic Entities

Economic entities are the decision-making units of an economic system. Normally, we think of such economic units as individuals, households, business firms and companies, institutions, and various organs of State. They undertake a variety of decisions while acting in different capacities, such as consumers, savers, investors, buyers of inputs, suppliers of goods and services, borrowers, lenders and so on. It is the decisions and activities of economic entities which comprise the working of an economy and determine its health and efficiency.

Check Your Progress A

1. State two important characteristics of wants which make them unlimited in number.

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2. What is an economic system?

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3. State whether the following statements are **True** or **False.**

   i) All the human beings have limited wants.

   ii) All persons have identical wants.

   iii) In some economic systems, it is possible to satisfy all wants of all persons.

   iv) Wants of a person depend entirely upon his income.

   v) A given want can be satisfied once, though it may emerge again.

   vi) Wants and means of their satisfaction can be combined in alternative ways.

   vii) Majority of individuals try to reduce their wants in line with the availability of means of satisfaction.

   viii) Economic entities are like commission agents who help others in activities like buying and selling.

1.3   FACTORS OF PRODUCTION

You have already learnt that the nature provides us, free of cost, with only a limited resources which are insufficient for satisfying all our wants. Accordingly, their availability has to be increased for satisfying additional wants. You can also say that these resources have to be produced.

In economics, the term **'Production' implies the transformation of various inputs into outputs thereby increasing the want-satisfying capacity of the inputs.** Items which are so transformed are called **inputs** while **output** is nothing but the transformed form of inputs. A particular transformation is production if the want-satisfying capacity of the output (also called 'product') is more than that of its inputs. To put it differently production is nothing but the **creation of utility.** Now you may ask what utility is. In economics, **utility means the expected satisfaction which the consumers hope to derive from the use of various goods and services.**

Transformation of inputs into output (i.e., production) can take many forms. Quite often there is a change in the physical and chemical form of inputs such as conversion of raw cotton into finished cloth. An item can acquire utility when it is transported to those who need it more. This form of production is through 'place transformation'. Similarly, many items gain utility when they are stored for later use. You can also think of various activities like processing, packing, etc., which form part of the production set-up of the

economy. It is also noteworthy that production includes the provision of services even when they do not involve the use of a material item.
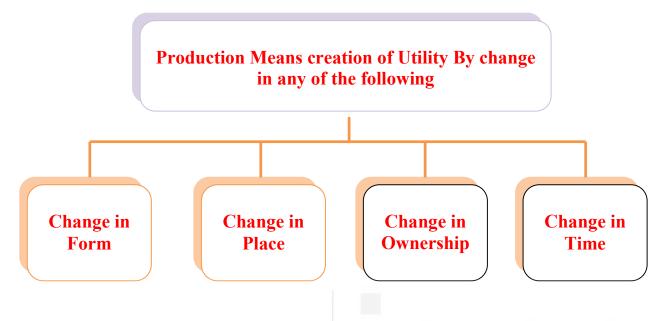
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│  Production Means creation of Utility By      │
│         change in any of the following        │
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│Change in │  │Change in │  │Change in │  │Change in │
│  Form    │  │  Place   │  │Ownership │  │  Time    │
└──────────┘  └──────────┘  └──────────┘  └──────────┘
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Figure 1.2: Meaning of Production

This brings us to the concept of **Production Resources** or **Factors of Production,** that is, items which act as inputs in production. Individual items of the inputs can be classified or grouped into some broad categories such that all units belonging to the same category are equally productive or homogeneous or perfect substitutes of each other while those belonging to different categories are not classified in this manner, each group of input units is referred to as a factor of production. In general, the input units are classified into four main factors of production. They are 1) land, 2) labour, 3) capital and 4) organisation or entrepreneurship. Let us discuss about each of them in detail.

1.3.1 Land

The term 'Land' does not represent just the area available for cultivation, factories, houses, roads, etc. It is used in a much broader sense. It includes the materials and the forces which nature gives us free for the satisfaction of our wants or for the production of goods and services. Thus, the term land not only includes land in ordinary sense of the term, but also the resources like water, climate, sunshine, minerals and the like.

In other words, land includes not only the land used for agricultural or industrial purposes, but also all the natural resources taken from above or below the soil. Thus, **land represents the sum total of natural resources available to the economy.**

Defined in this way, supply of land is fixed. It is predetermined by nature, and man cannot add to it through his own efforts. While an individual can get more of land by paying for it, the society as a whole cannot increase its availability. Land has no mobility. Land cannot be transferred from one place

to another. But its use can be transferred; a plot of land can be used either for paddy or for jute. However, a transfer price is necessary.

What about the market prices of different forms of land or natural resources? Although we say that land is a free gift of nature, an individual may not get the land free of cost. He has to pay some money and buy it. Market price to land comes into existence as a result of economic arrangements like private ownership and inheritance. Being scarce in supply, its ownership and possible use generate a price, which is normally called 'rent'.

1.3.2   Labour

In economics, the term labour is used to denote any manual or mental activity that is undertaken in exchange for a payment. This concept of labour, however, is confined to only human effort and the work performed by animals and machines is not considered as labour.

It is noteworthy that labour cannot be separated from the person of the labourer and used as an input. That is to say, the labourer has to sell it in person. Another feature of labour is that its performance cannot be postponed. If a labourer does not work during one month, then the labour of that period cannot be performed in future. Labour not performed is labour lost forever. For this reason, the bargaining strength of workers tends to be low and they frequently have to accept low wages or go without any income. Moreover, those workers who do not have any other source of income find themselves in a still weaker bargaining position.

SIZE OF LABOUR

Labour is not a homogeneous factor of production. We come across a large variety of workers, both skilled and unskilled. Clubbing them together in one group of factors of production is, therefore, helpful only in a simplified form of economic analysis. You would note that even unskilled workers do not have a uniform productive efficiency. Depending upon their health, general intelligence, age, social background, the extent of education etc., different workers have different productive capacities for a given job. Similarly, each worker is not equally productive in different jobs. His capacity to work changes when he shifts from one kind of work to another. This difference is more among skilled labour. A skilled worker is educated and trained for a specific job. Each kind of skilled job requires specific education and training. For this reason, labourers require additional training and education when they are shifted from one type of skilled work to another. If we ignore migration of workers from one country to another, the population of a country becomes the only source of its total labour force. But its size of labour force is influenced by other causes also, such as the proportion of persons in different age groups, social customs, attitudes, etc.

Size of labour force refers to the number of persons who are able and willing to work. Work force is that part of labour force which gets employed. Thus:
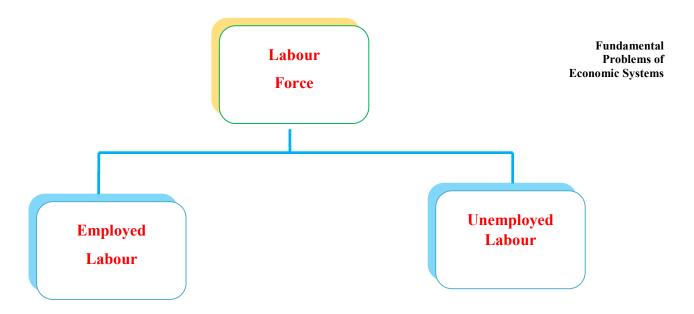
Fig 1.3: Size of labour

QUALITY OF LABOUR

Till now, we have been talking about the quantity of labour, that is, the number of workers available for different kinds of employment. However, the discussion of labour as a factor of production would remain incomplete without a reference to its quality. In the context of a single worker, this concept denotes two aspects: i) the intensity with which a worker works, and ii) the maximum efficiency which that worker can achieve.
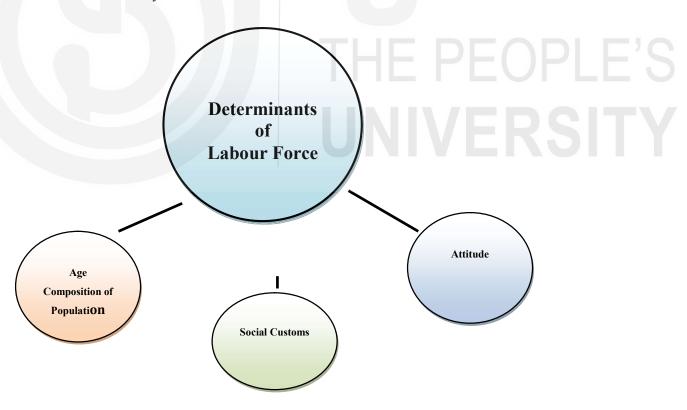
Figure 1.4: Determinants of labour force

The efficiency of labour depends upon the willingness of the worker to work without wasting any time and effort. It depends upon a number of influencing

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forces, such as the general social atmosphere, the loyalty which he feels towards his job, the wage rate, the work atmosphere and similar other aspects. The level of efficiency of a worker, on the other hand, depends upon his education and training, skill, health and personal qualities, the climatic conditions and the organisational set-up of the production unit.
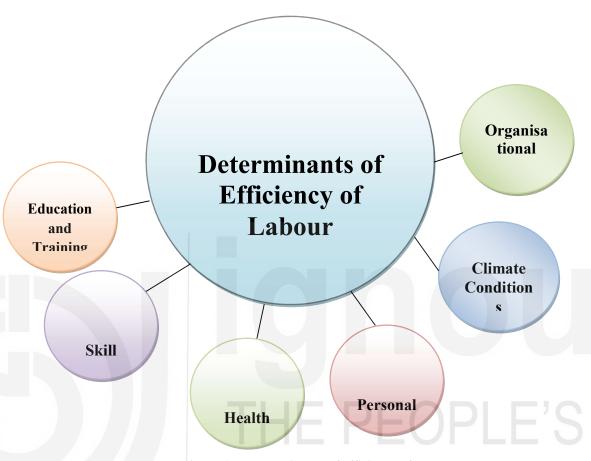
Figure 1.5: Determinants of efficiency of labour

Land and labour are called two primary factors of production. Production is not possible without using these two primary factors of production. Labour cannot work unless there is land to work upon, and land by itself cannot produce anything unless labour acts on it.

1.3.3   Capital

The term 'capital' refers to that group of productive resources which are the result of human labour. Capital represents man-made productive resources. They are produced means of production. While land is a free gift of nature in the sense that its availability is there without spending any labour on it, capital is not a free gift in that sense. Capital is, in a way, a form of concealed or crystallized labour. It appears in various forms such as plant and machinery, buildings, roads, bridges, means of transportation and communication, and so on.
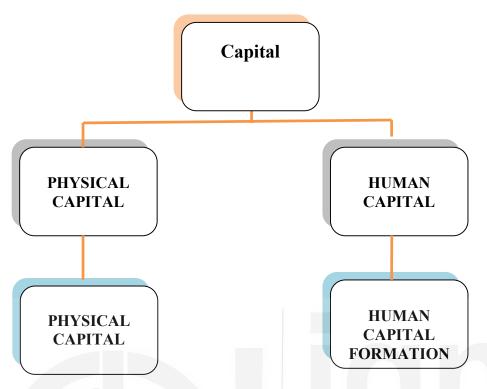
Figure 1.6 : Forms of Capital

The process of development requires skill and training of the labour force so that the labour force can make use of machines and equipment in an efficient manner. An underdeveloped country is required to train its labour force in engineering, technology, medicine, management and a number of other fields. Since skill formation improves the productive capacity of the labour force, this process is referred to as human capital formation. Since a healthy worker is considered more productive, investment in the health of workers is also included in human capital formation.

You should note that only those products which are meant to be used for further production come under capital. If a product is used for final consumption, it is not a part of capital goods. It frequently happens that while some units of a particular product are used as capital, others are used for final consumption. Such products, thus, become partly capital.

Since capital is the result of human labour going into the production of means of production instead of goods meant for consumption, there is no end or upper limit to the extent it can be accumulated. An economic system can keep diverting a portion of its productive resources to the production of goods meant for further production and thereby add to its capital stock. This process is called '**Capital formation'.** We should note that production involves the use of capital stock of the economy. Therefore, in the process of production, capital stock of the economy that gets used up. Machines and equipment, when used, undergo wear and tear, that is, machines and equipment get depreciated. These need are replaced by new machines and equipment. Thus, during a long period of time, some capital goods get depreciated, while new capital goods, equipment and implements get added.

If the amount of new machines and equipment added to the production unit is more than the amount of capital goods that got depreciated, the net stock of capital goods will increase. This net addition to the capital stock constitutes capital formation. Capital formation adds to the capital stock and hence it increases the production capacity of the economy. It thereby increases the size of potential output in the economy through use of machines and equipment, when used up, such machines and equipment also undergo wear and tear.

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│         Condition for Capital Formation         │
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┌─────────────────────────────────────────────────┐
│          New Addition of Capital Equipment       │
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│   Amount of Depreciation of Old Capital Equipment │
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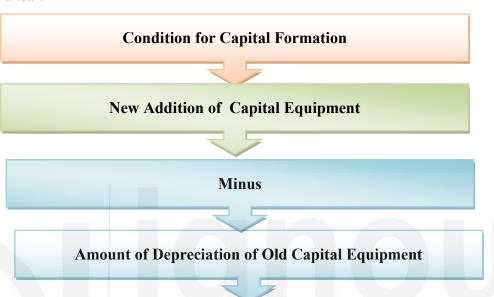
Figure 1.7: Conditions for Capital Formation

Why should an economy add to its capital stock? The answer lies in the fact that an increase in capital stock, when properly used, increases labour productivity. When the economy diverts its productive resources to the production of capital goods, there is reduction in immediate availability of consumption goods. But there will be much larger increase in the production of consumption goods in later periods.

1.3.4 Entrepreneurship

Economists believe in the existence of a fourth factor of production, namely, organization or entrepreneurship which is supplied by the entrepreneur. Land, labour and capital by themselves cannot come together and organize themselves into productive processes to yield output. They have to be procured and put to work in a systematic and coordinated manner. Most production processes are time consuming. The entrepreneur procures the inputs and pays for them in anticipation of receiving larger sales proceeds when the output is sold. It is the entrepreneur who assumes the risk of loss and it is he who is entitled to a profit, if there is any. The job of the entrepreneur is particularly risky in an atmosphere of uncertainty.

Check Your Progress B

1. List the major factors of production?

   …………………………………………………………………………

   …………………………………………………………………………

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2. State whether each of the following statements are **True** or **False.**

   i) Utility is the same thing as satisfaction.

   ii) Utility is the want-satisfying capacity of a thing.

   iii) Production is the creation of utility.

   iv) Availability of land to a country can be increased.

   v) A factor of production consists of various items which can be substituted for each other without affecting total output.

3. 1Fill in the blanks.

   i) .... and ....are two primary factors of production.

   ii) In a production process, inputs are the items which go into it while output are the items which ....

   iii) Capital is the means of production meant for ....

   iv) While land is a free gift of nature, capital is………….

1.4 FUNDAMENTAL/ CENTRAL PROBLEMS OF AN ECONOMY

You have learnt that the basic characteristic of every economic system is the scarcity of resources in relation to human needs, and the use of such resources in alternative ways to meet the ends. Accordingly, every economy is faced with certain basic or fundamental problems which it must try to solve within its socio-economic framework. These fundamental problems are:

i) What to produce?

ii) How to produce?

iii) For whom to produce?

iv) The choice between current consumption and growth through saving and investment.

Choice between Consumption and Savings

For Whom to Produce

How to Produce

What to Produce

Central Problems of an Economy

Figure 1.8: Fundamentals/Central Problems of an Economy

In addition, every economy has to face other important questions, such as the choice between public and private goods. There are also certain other problems like unemployment, balance of payments, etc., which crop up now and then and which may or may not be faced by all economies. Let us discuss in detail about these problems which are central or basic to every economy.

1.4.1 What to Produce?

You have already learnt that an economy does not have enough resources to produce everything required by it. So, it must be selective and decide what to produce and what not to produce. When some goods are not produced, some wants of the society remain unsatisfied. The decisions regarding the wants to be satisfied and the goods and services to be produced are interrelated and one does not stand independent of the other. This is called '**Allocation of productive resources'.** If some factors of production are employed in the production of product X, they are not, to the extent being employed in the production of product Y. The problems can be illustrated by the famous Production Possibility Curve which you shall study later in this unit.

You should note that this problem cannot be removed completely from the scene. Developed economies, for example, have more productive resources. Even in these cases, the resources are not sufficient for meeting all their needs. Moreover, the nature of this problem does not change by changing the structure of the economy. Irrespective of the type of economic system-a capitalist or a socialist or a mixed economy—the allocation of resources between production of different goods has to be decided. Later in this unit, you will study how different economic systems solve their problems in different ways.

1.4.2 How to Produce?

This is a problem which covers the details of the allocation of productive resources in the production of various goods and services. More precisely, you can say that when an economy decides to produce product X it has also to work out exactly how much of labour, capital, land etc., would go into its participation. The exact proportion of factors of production used in the production of an item is called the technique of production of that item. For example, we may think of goods which are produced by using more of labour than capital. In such cases, labour intensive techniques of production are said to be in use. On the other hand, if more of capital goes into the production of an item, then, we say, that it is being produced by a capital-intensive technique. For any country, ideally speaking, the choice of technique of production depend upon the relative availability of factors of production. A country like ours which has more of labour and less of capital should go in for labor-intensive techniques of production. Similarly, there are many countries which have abundance of capital but a shortage of labour. They should prefer capital-intensive methods of production.

When an individual producer is to decide about the technique of producing any particular product, he considers the prices and productivities of alternative inputs. He tries to use those inputs for which the output per unit of cost is the maximum because it is this choice which is most profitable for him. This way, he can keep the cost of production low and, thus, maximises profit.

His decision is based on consideration of following two factors:

i)   the relative price of labour and capital; and

ii) the relative efficiency of the two inputs

He will choose that combination of labour and capital that

a)   yields maximum output for the given combination; or

b)   the cost per unit of output i.e. the lowest.

1.4.3   For Whom to Produce?

A society comprises a large number of individuals and households. All the output of consumption goods and services is ultimately meant for their use. Therefore, all the goods and services produced are to be distributed amongst the individuals and households. The share of each individual and household has to be determined and also the quantities of specific goods and services which comprise that share.

You can easily see that it is possible to propose different principles whereby this distribution may be carried out. In an economic system organized on market principles, the income shares of individual members of the society are determined in the following manner. In a market economy, productive resources are privately owned. They are sold, bought and hired like any other goods or services. The price of a productive resource is determined by the market forces of demand and supply. Whenever it is to be employed by a producer, he has to pay its market price to its owner. It is for the owner to supply it to the market or withhold it. The income of each individual, under these conditions, is determined by the amounts of different productive resources owned and supplied by him to the market and their respective prices.

This system of income distribution has obviously many shortcomings. It is not related to the effort put in by members of the society. The ownership of means of production is uneven between members of the society. This leads to large scale inequalities of income distribution also. In modern economies, governments try to reduce these inequalities through various measures like taxation, etc.

In a socialist economy, on the other hand, an effort is made to reduce the inequalities by shifting the ownership of means of production (other than labour) to the State or cooperatives, and relating incomes of individual members of the society to their work performance. The state assures some basic necessities for everyone and it also takes care of the old, sick and

children. An individual can get additional income only by doing some additional work.

You would note that in an underdeveloped economic system, which has a limited number of households and individuals, it is possible to have complete physical rationing of goods and services. But with development, the organisational structure of an economy also becomes increasingly complex. It starts producing a much larger quantity of goods and services. As the number of occupations increases, the variety of inputs and outputs leads to a corresponding increase in the number of goods and services. Quite often, the size of the society also becomes large. Under such circumstances, it is no longer possible to have a system of complete physical rationing of goods and services. It is more practical to ensure purchasing power to individual members of the society and at the same time fix prices for goods and services. When the members have the purchasing power, they can decide on their own what to buy and how much to buy, subject to the condition that they pay for each purchase. But in this manner, the problem for whom to produce boils down to that of distribution of income amongst members of the society. It is possible that the actual pattern of income distribution may have such inequalities which are not acceptable to the society. In that case, the authorities try to modify the income distribution through various policy measures including taxation.

The problem of distribution does not have any easy solution. It is not always possible for everyone to agree to a particular rule of income distribution and the extent to which income inequalities should be allowed. It is also not easy to estimate relative needs of the members of the society. Moreover, any system of income distribution is bound to have an impact of incentives for production by the members of the society and, therefore; on the level of national income.

1.4.4 The Problem of Growth

Every economy seeks to increase its stock of capital to increase its production capacity and thereby generate more income. The generated income in an economy has two alternative uses, viz. consumption expenditure (C) and saving (S). Thus, $Y = C + S$, saving is source of finance for investment in an economy. Investment adds to the capital stock of an economy. And therefore, there is a need to reduce consumption expenditure (and thereby increase investment); this help in capital formation.

1.4.5 Choice between Public and Private Goods

In order to understand the problem of choice between private and public goods, you should first know the meaning of public and private goods. Let us understand these two concepts first.

1. **Private Goods:** There are certain goods (the term goods here includes services also) whose availability can be restricted to selected individuals only. For example, a product may be priced in the market and only those who pay its price may be allowed to have it. This characteristic of a

product by which some people can be prevented from its use is referred to as the 'principle of exclusion'. Accordingly, those persons who cannot pay for it or who are not ready to pay, are not allowed to use it. The use of the goods is thus divisible between different persons. Any goods which can be priced and whose use can be restricted to selected persons is termed as Private goods. You should remember that private goods are not necessarily produced by the private sector of the economy. It may also be produced by the government or public sector or by cooperatives or by production units owned jointly by the private and public sectors.

2. **Public Goods:** When it is not possible to restrict the availability of a product to selected individuals, they are termed as Public goods or Social goods. Such goods cannot be so priced as to deprive some persons from using it. That way, it is indivisible. Defence service is a typical example of a public service. When a country is protected against foreign aggression, every citizen is protected. You cannot declare that only those who pay a stated price to it would be taken care of and others would be left unprotected. Similarly, when street lights are provided, everyone in the locality gets the benefit. But you should know that equal availability of public goods does not mean that every member of the society actually gets an equal share in it. For example, people living near the political boundaries of a country or near the sensitive military targets are likely to suffer more than others in a war. The main criterion of indivisibility of goods is that it should be equally available to all members of the society without consideration of their ability or willingness to pay for it. Such goods have to be provided out of the public funds and not through market pricing.

In actual practice, it is difficult to find pure public or pure private goods. Most of them are a mixture of both. We, therefore, term goods public or private depending upon its dominating characteristics.

With its limited resources, an economy cannot have enough of both public and private goods. It must try to achieve an optimum combination of both. This decision also brings in another question. Who should be given the responsibility of providing public goods and who should provide private goods? Economists argue that those goods which are predominantly public in character should be produced by the public sector, since their cost of supply cannot be recovered through sale proceeds. On the other hand, private goods can be provided by both the private sector and the public sector. The choice depends upon the philosophy which the society believes in.

1.4.6 The Problem of Merit Goods

This is other problem which a modern society faces. **Those goods whose consumption is considered highly desirable for the members of the society are termed as Merit goods.** The important feature of the merit goods is that their consumption benefits both the users and non-users. For example, if a person is educated, it not only helps him but also the society as a whole. Education, therefore, is a merit product/ service and it is desirable that every

member of the society gets education. Consumption of merit goods benefits the society as a whole and raises the level of its efficiency and well-being. Therefore, every society has to decide the extent it can and should produce and consume merit goods. It is found that if the production and supply of merit goods is left in the hands of the private sector, the amount produced remains quite insufficient. For example, education is a costly merit service, and every one cannot pay for it. Therefore, if it is left in the hands of the private sector, many intelligent and deserving but poor students would not be able to study. Such a situation would be bad not only for such students themselves but also for the society as a whole. Similar disastrous results would follow if health care was left totally in the hands of the private sector. It allows, therefore, that the authorities should either take up the responsibility of providing merit goods themselves, or at least supplement their supply by the private sector.

Check Your Progress C

1. What are the fundamental problems of an economy?

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2. What is capital formation?

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3. What is a technique of production?

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4. What are merit goods?

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5. Differentiate between public and private goods.

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6. State whether each of the following statements are **True** or **False.**

   i) Allocation of productive resources is similar in all types of economies.

   ii) The exact proportion of factors of production used in the production of an item is called the technique of production of that item.

   iii) Private goods are available to all individuals free of cost.

   iv) Goods whose availability is not restricted to selected individuals are called public goods.

   v) Consumption of merit goods is beneficial only to those persons who consume them.

   vi) Indian Airlines supplies a service which adds to well-being people; hence it is public good.

7. It is always desirable to replace labour by capital. Why?

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1.5 PRODUCTION POSSIBILITY CURVE

You have learnt that an economy cannot produce everything it requires and a choice has to be made between various goods and services that can be produced. You also know that increasing the production of some goods implies a corresponding reduction in the production of other goods because less of productive resources are left for the latter. The economy, therefore, has to choose between alternative combinations of goods and services. This problem of choice can be illustrated by a simple graph known as **Production Possibility Curve or a Product Transformation Curve.** A typical Production Possibility Curve (PPC) is drawn on the following assumptions:

i) The country has to choose between alternative combinations of only two goods, say, LED (L) and Computer monitor (M).

ii) All productive resources of the country are given and addition to them is not possible.

iii) All productive resources of the economy are fully employed. There is no wastage or underemployment.

iv) The productive resources are suitable for the production of both goods, i.e., L and M. They can, therefore, be shifted from the production of one to the other goods. However, such a shift would reduce the production of the first goods and increase that of the other.

v) No factor of production is considered to be specific in the production of one good alone and totally inappropriate for the production of the other.

vi) We consider the productive efficiency of the productive resources only in physical terms, i.e., the units of LED (L) and Computer monitor (M) which they can produce. No effect on their prices is taken into account.

Efficiency in production means productivity i.e. output per unit of an input. Let the input be worker. Suppose an economy produces only two goods X and Y. Suppose a worker is employed in production of X because he is best suited for it. The economy decides to reduce production of X and increase that of Y. The worker is transferred to Y. He is not that efficient in production of Y as he was in X. His productivity in Y will be low and so cost of production high.

Based upon these assumptions, we can illustrate the set of production possibilities faced by a country by a hypothetical example. Look at Table 1.1 carefully. The figures in the table show that all the productive resources of the country put together can produce a maximum of either 30 L or 30 M or some other combinations thereof. Note that the maximum possible units of L and M need not be equal. They are only so in our example. It is also seen that as more L are produced, the quantity of M keeps decreasing. Thus, for example, when the production of L is increased from 15 to 20 in number, the production of M falls from 24 to 20. It means a loss of 0.8 of M for each additional L. Similarly, when production of L is increased from 20 to 25, production of M falls from 20 to 14. It is a loss of 1.2 of M for each additional L produced. Similar, position would be found if we increase the production of M and reduce that of L. Thus, when we increase the production of M from zero to 14, production of L falls by 5. In other words, each unit of M causes a reduction of 5/14 or 0.357 L. However, when the production of M is increased from 14 to 20, the fall in the production of L per unit of M work out 5/6 or 0.833 per L.
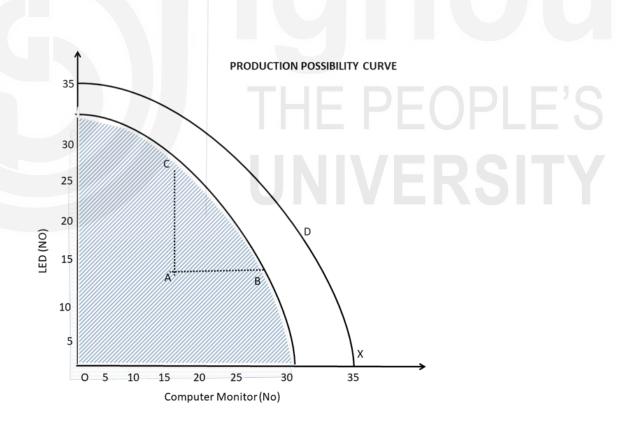
The production possibilities illustrated in Table 1.1 are also represented in Figure 1.1 in the form of a Production Possibility Curve (PPC)

Units of Mis measured along X-axis and the Units of L are measured along Y-axis. The respective pairs of the units of L and M are plotted and joined with each other to yield a curve which is called the Production Possibility Curve. Thus, the PPC represents all the possible combinations of L and M which can be produced by using all the productive resources of the economy. In that sense, each point on the curve represents the maximum possible

output and, for that reason, it is also termed as the Production frontier of the economy.

Table 1.1 Production Possibilities Faced by Country

Combination	LED (L) (Unit)	Computer Monitor (M) (Unit)	Loss of M for each additional L produced (Unit)	Loss of L for each additional M produced (Unit)
1	30	0	2.8	-
2	25	14	1.2	0.357
3	20	20	0.8	0.833
4	15	24	0.6	1.250
5	10	27	0.4	1.667
6	5	29	0.2	2.500
7	0	30	-	5.000

Figure 1.9: Production Possibility Curve

The economy can produce any combination of L and M represented by a point either on the PPC or in the shaded area of the diagram. Production combinations, represented by the shaded area imply that the economy can produce either L or M or both, but if it does so it is wasting some of its

productive resources. Thus, consider point A which represents a combination of 10 units of M and 14 units of L. The PPC, however, shows that with this much of M, the economy can produce 27 L (as shown by point C on PPC). Alternatively, with 14 L, the quantity of M can be increased to 25 (see point B).

Any point beyond the PPC, that is in the non-shaded area of the diagram, shows a combination of L and M which the economy cannot produce. For example, point D represents a combination of 30 units of M and 20 units of L. However, when 30 units of Mis produced, no resources are left for the production of L. On the other hand, if 20 L are produced, then the quantity of M has to be reduced to 20 units.

Characteristics of PPC

A typical PP curve has two characteristics:

1) **Downward sloping from left to right**

   It implies that in order to produce more units of one good, some units of the other good must be sacrificed (because of limited resources).

2) **Concave to the origin**

   A concave downward sloping curve has an increasing slope. The slope is the same as MRT. So, concavity implies increasing MRT, an assumption on which the PP curve is based.

Can PP curve be a straight line?

Yes, if we assume that MRT is constant, i.e. slope is constant. When the slope is constant the curve must be a straight line. But when is MRT constant? It is constant if we assume that all the resources are equally efficient in production of all goods.
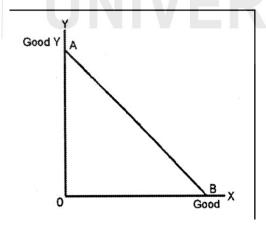

Figure 1.10: Straight line PP Curve

Note that a typical PP curve is taken to be a concave curve because it is based on a more realistic assumption that all resources are not equally efficient in production of all goods.

Does production take place only on the PP curve?

Yes, and No, both. Yes, if the given resources are fully and efficiently utilized. No, if the resources are underutilized or inefficiently utilized or both. Refer to the figure 1.10
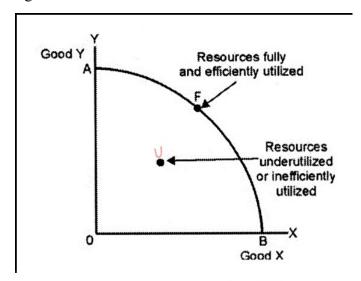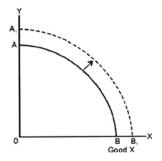

Figure 1.11: PP Curve and Production

On point F, and for that matter on any point on the PP curve AB, the resources are fully and efficiently employed. On point U, below the PP curve or any other point but below the PP curve, the resources are either underutilized or inefficiently utilized or both. Any point below the PP curve thus highlights the problem of unemployment and inefficiency in the economy.

Can the PP curve shift?

Yes, if resources increase. More labour, more capital goods, better technology, all means more production of both the goods. A PP curve is based on the assumption that resources remain unchanged. If resources increase, the assumption is broken, and the existing PP curve is no longer valid. With increased resources there is new PP curve to the right of the existing PP curve.

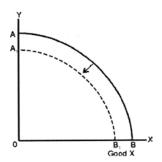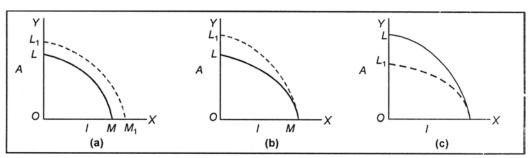

Figure 1.12: Shift of PP Curve to right

Figure 1.13: Shift of PP curve to left

It can also shift, to the left if the resources decrease. It is a rare possibility but sometimes it may happen due to fall in population, due to destruction of capital stock caused by large scale natural calamities, war, etc.

Brain Teasers

Q.1. Which of the following will be the new production possibility frontier, if new technology is developed that enables higher productivity in Agricultural (A) only? Industrial output (I) is not impacted.

Ans. Fig. (*b*)

Extension of the Production Frontier: The PPC or production frontier is subject to a change over time. As an economy adds to its productive resources, or learns to use them more efficiently, its productive capacity increases and it can produce more of both LED (L) and Computer monitor (M). As a result, the PPC moves outwards as, for example, to the position shown by the upper line. It should be noted that the new PPC need not be parallel to the old one.

1.6   ALLOCATION OF RESOURCES

You know that every economy has to decide about the allocation of its productive resources between different uses. In this context a question arises as to how this issue is resolved. While trying to answer this question, we should keep in mind that the pattern of resources allocation is closely linked to the solution of the fundamental problems of an economy which have been discussed earlier in this unit.
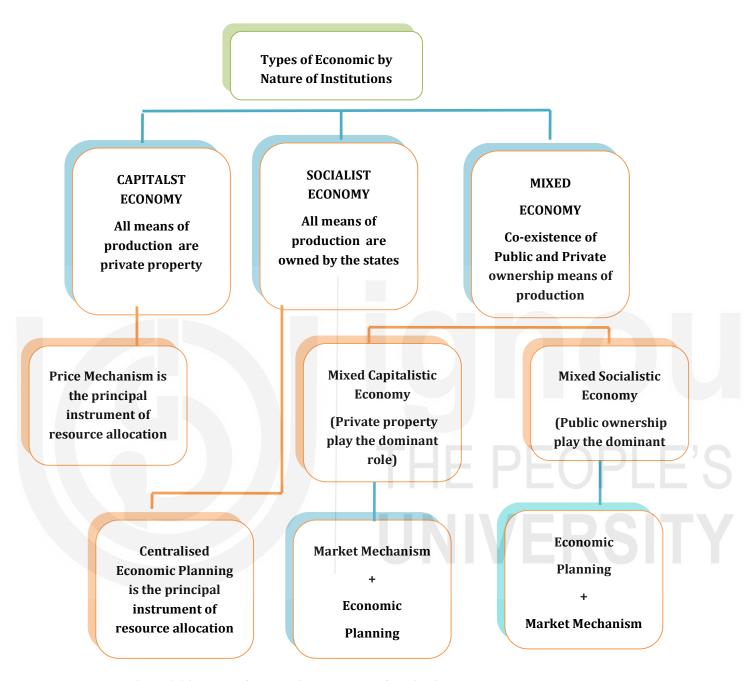
Figure 1.14: Types of Economies by Nature of Institutions

The problem of resources allocation may be tackled in several ways and each economy tries to solve it in line with its own chosen objectives. For this purpose, every economy devises a system of rules and regulation. To administer these rules, institutional arrangements are made. A set of such institutional arrangements is called an economic system. The nature of economic system may vary from a system in which all means of production are owned by the State, to a system in which all the means of production are private property. This type of economic system is called a socialist economy or a centrally controlled economy. The latter type of economy is called a free market economy or a capitalist economy. Each economic system selects certain rules and regulatory devices which guide the allocation of productive

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resources. However, it need be deemed here that no single system of resource allocation can be termed ideal or best for all economic systems and for all times to come. Therefore, most of the economics turn around a system in which public ownership over the means of production co-exists with private ownership. This system is called a mixed economy.

1.6.1 Resource Allocation in a Capitalist Economy

At this stage of your study, the terms capitalist economy and market economy may be treated as one and the same. For understanding the problem of resource allocation in a capitalist economy, we should first know the relevant characteristics of such an economic system. The characteristic features of a capitalistic economy are as follows:

i) Means of production, i.e., the productive resources, are privately owned. Those people who own the resources have the authority to withhold their supply from the market whenever they want to.

ii) All goods and services (including productive resources) have a price in the market determined by the interaction of demand and supply. The free interaction of prices with forces of demand and supply covers all the goods and services and it is called the **Price mechanism.** Remember that freedom of price mechanism is an important characteristic of capitalism or a market economy.

iii) Labour power is also considered a commodity and can be bought and sold just like any other commodity.

iv) Every economic unit behaves in a rational manner, that is to say, it acts only in its own interest. The seller sells a product to the highest bidder only and the buyer buys a product at the lowest possible price, and so on.

v) The income of an individual member of the society is determined by two aspects:

1) the quantities of productive resources supplied by him to the market, and

2) the prices at which they are paid for.

vi) Every economic unit is guided by the price mechanism. It takes note of the changing prices and takes decisions covering buying, selling, consumption investment, production and so on.

In such an economy those goods and services are produced which yield maximum profits. Therefore, productive resources are also allocated to such items only. Since goods with higher demand fetch higher prices and yield more profit, the productive resources are allocated to the production of the most profitable goods. But there is also the question as to which specific resources should be used to produce a specific item. The employer makes this choice by considering two aspects: a) productivity of a factor of production, and b) the price which has to be paid for it. He compares these two aspects of every productive resource, and selects a factor for which the ratio of productivity to price is higher. The employer tries to ensure that for each rupee spent on inputs, he gets the maximum possible return. You already

know that prices of productive resources and their ownership determine the distribution of income among the members of the society. They in turn decide which goods and services to demand. In this manner, the market mechanism guides every economic unit in its decision-making and determine the allocation of resources between different employments.

In a market economy income distribution suffers from large scale inequalities. In a poor country like ours, people with low income often do not have enough purchasing power to demand basic necessities of life while rich people demand luxuries, and make it profitable to produce them. As a result, in such a country, there may be insufficient production of basic necessities like milk while the economy may be producing luxuries like air conditioners. To put it differently, the demand pattern generated by inequalities of income distribution may not represent real needs of the society.

Every economy divides a system as per rules and regulations. To administer these rules, institutional arrangements are made a set of such institutional arrangement i.e. called an economic system. The nature of economic system may vary from a system in which all the means of productions are owned by the state, to a system in which all the means of production are private property. This type of economic system is called a socialist economy or a centrally controlled economy. The later type of economy is called a free market economy or a capitalist economy.

1.6.2 Resource Allocation in a Socialist Economy

The term socialism is used to represent a number of economic systems which differ from each other in details. However, main features of a socialist economy are as follows:

i)   The means of production are not privately owned. Instead, they are owned by cooperatives or by the government.

ii) A socialist economy tries to maximize the welfare of the members of the society. It tries to ensure that the production of goods and services is in conformity with the actual needs of the members of the society. It also tries to reduce income and wealth inequalities to the minimum possible level.

iii) With these objectives in view, market mechanism is not allowed to work freely. This means that prices are not allowed to fully reflect the effects of demand and supply forces. Similarly, decision regarding demand and supply of goods and services are not always guided by prices. Such decisions are taken out of the hands of individual economic units. Instead they are taken by some form of central planning authority such as the government itself or some agency appointed by it for this purpose. The central authority takes the necessary decisions on behalf of individual economic units. It is the central planning authority which decides the way the central problems of the economy are to be solved. It is for this reason that a socialist economy is usually referred to as the centrally planned economy also.

iv) The producers and sellers are not allowed to act rationally. That means they are not allowed to maximise their profits. Instead, most prices of inputs and outputs are administered, that is, decided administratively by the authorities. Some of the essential goods and services may be rationed and provided to all or selected members of the society freely or at subsidized rates. Generally, only on-essential items are sold at market prices.

Thus, the entire decision-making regarding resource allocation is in the hands of the authorities in a centrally planned economy. The market forces are not allowed to influence these decisions. The authorities decide what goods and in what amounts are to be produced. They decide the allocation of resources for the production of these goods. Considerations of prices and profits are not allowed to affect their decisions. Instead they have the goal of finding out the real needs of the society and direct the productive resources of the economy towards meeting them. A major drawback of a socialist system is that it may reduce the incentive to work and produce. Therefore, a worker can get additional income only by putting in additional labour.

1.6.3 Resource Allocation in a Mixed Economy

A mixed economy is one in which some decisions are left to the market forces while others are taken under direct government regulation or even ownership. Some selected areas of economic activities are reserved for the government sector. The government acquires the necessary productive resources for these activities and employ them in conformity with its priorities. The production pattern of the public sector, the prices of output items of the public sector and other measures are used to regulate the allocation of resources in private sector as well. These other measures include price controls, licensing, taxation, subsidies, and others. Additionally, various labour welfare measures are undertaken. Similar steps are taken to encourage the use of productive resources for encouraging the development of backward areas of the country, for removing specific shortages, and for bringing about a balanced development of the economy as a whole.

Check Your Progress D

1. What is Production Possibility Curve?

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2. State whether each of the following statements are **True** or **False:**

   i) In a market economy, resource allocation is always in conformity with real needs of the society.

   ii) Decisions based on economic rationality are always good from the society's point of view.

iii) In a market economy, decisions of every economic unit are guided by price signals.

iv) In a socialist economy; the central problems are solved by market mechanism.

v) In a mixed economy, resource allocation is decided partly by the authorities and partly by the private sector.

vi) In a mixed economy, private sector is left totally unregulated by the authorities.

3. Fill in the blanks.

   i) The term market mechanism denotes an interaction between ....

   ii) Economic .... means that an economic unit is acting to serve its own interests.

   iii) In a ....economy, all economic decisions are guided by economic rationality.

Brain Teasers

Q.1. Giving reasons, state which of the following statements are True or False:

   (i) An economy always manages to meet all the needs of the people living in the country.

   (ii) In the context of an economy, when we talk about 'scarcity', we refer to short supply of money.

   (iii) A 'Production Possibility Frontier' (PPF) is always represented as a downward sloping curve.

   (iv) How does Honda Motor Car Co. fix the price of its cars is studied in macro-economics.

Ans.(i) *False:* An economy seeks to provide means of living to all the people. It may be successful (as in most of the developed countries), or it may not be successful (as in many underdeveloped countries) to achieve its objective.

   (ii) *False:* Scarcity refers to limited availability of all types of goods and services in relation to their requirements. The concept of scarcity, thus, is not limited to money alone.

   (iii) *True:* A PPF represents different combinations of two commodities that can be produced with the help of available resources in an economy. If an economy decides to produce a larger quantity of one commodity, it would be left with lesser resources to produce another commodity. A downward sloping curve represents this relationship.

   (iv) *False:* Macroeconomics is the study of aggregates e.g., determination of general price level in an economy. The principles

underlying the pricing of a single good by a single firm or single industry are studied in microeconomics.

Q.2. Give reasons for the following:

(i) A Production Possibility Frontier is always a downward sloping concave curve.

(ii) An efficient economy would always produce a combination of goods that lies on the given Production Possibility Frontier.

(iii) Growth of an economy is represented in the form of a rightward shift of a Production Possibility Frontier.

Ans. (i) One, a PPF slopes downward to indicate that if an economy chooses to produce a larger quantity of one commodity it would have to reduce the production of another commodity.

Two, the concave shape of the PPF is due to the applicability of the Law of Increasing Marginal Opportunity Cost.

(ii) Any point on a given PPF presents a production available resources. Likewise, any point to the right of the PPF is beyond the available resources. Any combination located below the given PPF shows on underutilization of available resources. Likewise, any point to the right of the PPF is beyond the available resources.

(iii) By economic growth, we mean that an economy has developed greater capacity to produce larger quantity of goods by acquiring more resources. Graphically, this would be represented by a rightward shift of the PPF.

Q.3. Giving reasons, state if the following statements are true or false:

(i) Because of destruction caused by war, a country's PPF will-shift to the right.

(ii) A job guarantee scheme will lead to a rightward shift of the PPF.

(iii) If a PPF shifts to the right, the new PPF will be parallel to the original.

Ans. *(i)* False: Country's PPF will shift to the left; this will be due to the fact that the country's capacity to produce will get reduced.

(ii) False: A job guarantee scheme does not add anything new to a country's resources. This will only ensure that available unutilized or unemployed resources are productively employed.

(iii) False: A new PPF needs not to be parallel to the old one. It can take any possible shape.

Q.4. Give reasons for the following:

(i) Every economy has to make the decision relating to what to produce.

(ii) Problem of choice arises because available resources have alternative uses.

Ans.(i) Every economy gets faced with the scarcity of resources, i.e., no economy possesses infinite resources to produce each and everything in infinite quantities. Therefore, it has to decide to produce a good and forego the production of another.

(ii) Available resources are always scarce. But the available resources can be put to alternative uses. Therefore, an economy will always prefer to make use of its resources in production of those goods and services that are most desired and forego the production of less-desired goods and services.

Q.5. Giving reasons, state which of the following are normative statements:

(i) A rise in the price of a commodity results in a fall in quantity demanded of commodity.

(ii) A good monsoon results in good agricultural output.

(iii) Government should raise taxes on industries that cause pollution.

(iv) Households should be advised to cut back their consumption expenditure.

Ans.(i) and *(ii)* are only positive statements. These state a simple cause-and-effect relationship.

(iii) and (iv) are normative statements. They have an element of judgement. They suggest a course of action that may be undertaken to reach the desired end.

Q.6. Giving reasons, state if the following statements are true or false:

(i) In a market economy, government does not impose any taxes.

(ii) In a centrally controlled economy, all the means of production are state-owned.

(iii) The USA is a mixed capitalistic economy, as is India.

Ans.(i) *False:* In a market economy most of the means of production constitute private property. Therefore, most of the economic decisions are taken by resource-owners. But that does not mean that the government does not perform any function in this type of economy. In order to perform these functions, every government collects revenue by way of taxes.

(ii) *True*: Means of production are not a private property. These are owned by the state, which decides their use.

(iii) *True:* The USA, as also India, is a mixed capitalistic economy. State-owned enterprises co-exist with private ownership over assets and enterprises.

1.7   LET US SUM UP

Every society is faced with an unending problem of scarcity of means in comparison with their need to satisfy the ever-increasing and unlimited wants. So, every society tries to increase the availability of the means on one hand and to economies their use on the other. For this purpose, various institutions, methods and arrangements are devised, and they, in their totality, are called an 'economy' or an economic system'. The precise nature of an economic system differs from society to society. Moreover, the economic system adopted by a society also keeps on changing over time. Economies may be classified in a number of ways, such as on the basis of predominance of productive resources in use, the type of goods and services produced, the type of institutions and property rights, and so on. Economic entities are the decision-making units of an economic system.

Productive resources or means of production are the inputs used for production. The term production is taken to mean the creation of or addition to utility (i.e., the want-satisfying capacity of an item). Means of production can be classified into groups of homogeneous units (i.e., units which can be substituted for each other without affecting total production). Each such group is known as a 'factor of production'. It is conventional to group the factors of production into four categories: 1) land, 2) labour, 3) capital, and 4) organization or entrepreneurship.

Land denotes productive resources provided free of cost by nature. It cannot be created by man though it is possible to discover existing but unknown resources. Similarly, it is possible to discover new uses for the known resources. Labour stands for both physical and mental efforts of human beings used for production. Capital represents the sum total of man-made resources, (i.e., the produced means of production). Entrepreneurship is the ultimate decision-making and risk bearing function connected with business activities.

Every economy has some fundamental problems which originate from the scarcity of means of production in relation to wants. These problems are i) what to produce, ii) how to produce, iii) for whom to produce, and iv) the choice between current consumption and growth through saving and investment. The problem of what to produce is closely related to the allocation of means of production between alternative employments, while choice of techniques highlights the problem of how to produce. In addition, every economy has also to decide between the private and public goods, as also the extent to which private goods should be produced in the private sector.

Furthermore, every economy is faced with the need to increase the supply of merit goods i.e., goods whose consumption is believed to be beneficial both for the consumers and for the society as a whole.

The problem of what to produce is generally illustrated with the help of a Production Possibility Curve (PPC) or 'Product Transformation Curve'. It is drawn on the basis of some simplifying assumptions. The main idea conveyed by a PPC is that when an economy is using its resources fully, then with given techniques of production, it cannot increase the production of some goods without simultaneously reducing that of the others. However, with economic growth it is possible to simultaneously increase the production of all goods and the PPC moves outwards.

Allocation of resources is different from one economic system to the other. In a market-or capitalist economy, the allocation takes place with the help of market mechanism, that is, through the interaction between demand, supply and prices. In this economy, the means of production are owned by private economic units and they take decisions in different capacities (such as consumers, producers, and so on) in response to changes in prices caused by market mechanism. The response of each unit is dictated by considerations of economic rationality. The employment of means of production is decided by employers by comparing the productivity of an input with its price. The employer tries to ensure that for each rupee spent on inputs, he gets the maximum possible return. Accordingly, it is the demand pattern in the economy which finally determines the resource allocation. Since, a market economy is characterized by large scale inequalities of income and wealth distribution, the demand pattern is not able to reflect the true needs of the society. It becomes profitable to produce and sell luxuries than necessities. Consequently, the resource allocation also does not reflect the true needs of the society.

In a socialist economy, the means of production are not owned privately. Instead, they are owned by the government or cooperatives. A socialist economy tries to reduce income and wealth inequalities. It tries to ensure that the production of goods and services (and, therefore, resource allocation) conforms to the actual needs of the society. For this reason, market mechanism is not allowed to work freely. Prices of most goods and services are decided administratively without reference to their demand and supply position. Individual economic units are restricted in their decisions on the basis of economic rationality.

In a mixed economy, decision-making is shared between individual economic units and the authorities. However, where need be, even private economic units operate under a variety of government regulations such as price controls, subsidies, taxes, licenses, quotas, labour laws, and so on.

1.8   KEY WORDS

Capital: Man-made or produced means of production.

Capitalist Economy (Market Economy): An economic system in which the means of production are owned and inherited by individuals. They take the economic decisions and they are guided by the prices of goods and services in the market.

Economic Entities: The decision-making units in an economic system.

Economic System or An Economy: The sum total of all institutions, methods and arrangements to deal with the problem of scarcity of means (resources) in relation to unlimited wants and the choice of wants to be satisfied.

Entrepreneurship: The ultimate decision-making and risk-bearing connected with business activities. This is the organizing function which combines the services provided by other resources so that goods are produced.

Factors of Production: The inputs (land, labour, capital and entrepreneurship) necessary to carry on production.

Input: An item which goes into the production process.

Labour: Human effort, physical and mental, which is used as input for production.

Land: Those means of production which are provided free of cost by nature. It includes land used for agricultural or industrial purposes, as well as natural resources taken from above or below the soil.

Market Mechanism: Denotes the interaction between demand, supply and prices and the response of decision-making economic units to changes in prices.

Merit Goods: The goods whose consumption is believed to be desirable for the benefit of the society and the consuming individuals.

Private Goods: Goods whose availability can be restricted to selected users. It is divisible in that sense.

Production: Creation of utility by different methods.

Production Possibility Curve or Product Transportation Curve: A graphic representation of the combinations of maximum amounts of goods X and Y which can be produced with the given productive resources of the economy and under certain other simplifying assumptions.

Productive Resources: Items which can be used as inputs in production.

Public Goods: Goods or services whose availability cannot be restricted to selected users only through pricing or through other measures. The benefits of the goods are indivisible and people cannot be excluded.

1.9   ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

3.   i)   False ii) False iii) False iv) False v) True vi) True vii) False

     viii) False

4.   c

Check your progress B

2. i) False ii) True iii) True iv) False v) True

3. i) Land, Labour ii) come out of it iii) further production

    iv) created by man

Check your progress C

6. i) False ii) True iii) False iv) True v) False vi) True

Check your progress D

2. i) False ii) False iii) True iv) False v) True vi) False

3. i) demand, supply and prices   ii) rationality   iii) market/capitalist

1.10   TERMINAL QUESTIONS

1. What is an economic system? Explain the fundamental/central problems
    of an economy.

2. What are the main characteristics of human wants?

3. 'Scarcity is the mother of every economic system'. Explain.

4. What do you understand by factors of production? Briefly explain each
    of the four main factors.

5. Write short notes on the following:

    a) Public goods and Private goods

    b) Merit goods

    c) Human wants

6. Explain how the solutions to the fundamental/central problems of an
    economy are interlinked with each other.

7. Explain the concept of a Production Possibility Curve. Enumerate its
    assumptions. Illustrate it with the help of an example.

8. Briefly explain how resource allocation takes place in the following
    economic system.

    a) Market economy

    b) Socialist economy

    c) Mixed economy

9. Giving reasons state which of the following statements are true or false:

    i.   All human wants cannot be satisfied. It is a universal truth.

    ii. Only a resource rich economy like Dubai is not faced with the
         problem of choice.

iii. The difference between labour force and work force of an economy indicated the size of unemployed persons.

iv. National Library at Kolkata is a right example of a public good.

Answers: i. True, ii. False, iii. True, iv. True

10. Match the pairs among the following:

i.	Economic Planning	a.	Capitalism
ii.	Public Park	b.	Socialism
iii.	Income determined by market forces	c.	Public good
iv.	Re-distribution of income	d.	Instrument of Resource Allocation

Answer: i. d; ii. c; iii. a; iv. b

Note : These questions will help you to understand the unit better. Try to write answers to them. Do not sent these answers to the university for assessment. They are for your practice only.

UNIT 2 BASIC CONCEPTS AND FRAMEWORK

Structure

2.0 OBJECTIVES

After studying this unit, you should be able to:

- explain important concepts and terms which form a part of popular economic vocabulary;

- describe how economic reasoning is arrived at and generalisation of economic laws are formulated;

- state the nature and reliability of economic laws;

- explain some of the analytical concepts associated with economic reasoning; and

- discuss whether economics is put to use for improving our material well-being or not.

2.1 INTRODUCTION

In Unit 1 you have studied the meaning of an economic system, fundamental problems faced by all economic systems, factors of production and how

resources are allocated in different types of economic systems. In the process of discussion, you come across some basic concepts like utility, production, factors of production/inputs, production possibility curve, scarcity, etc. In this unit, you will learn more details about some of these concepts and also be introduced to a few more new concepts. You will also study how different parts of an economic systems are interdependent. You will be introduced to the fundamentals of economic reasoning and the nature and reliability of economic laws and theories. Similarly, you would learn whether Economics is only a knowledge giving subject or provides practical guidelines for improving our material well-being. While studying this unit, a few analytical concepts connected with economic reasoning will also be discussed.

2.2   PRELIMINARY ECONOMIC VOCABULARY

Utility: You already know that utility of goods is their want-satisfying power. It is satisfaction expected from the use of a product under consideration and is, therefore, subjective and not objective. That is to say utility of goods for a consumer depends upon his assessment of the satisfaction which he hopes to derive from their use. There is no way of measuring it either by mechanical or quantitative methods. Utility also depends upon the intensity of the want/wants to be satisfied. As a result, utility of goods differs from one individual to another. Also, for the same individual every additional unit of goods is expected to yield relatively lower utility, because the intensity of the want being satisfied decreases with the use of the goods.

We can measure Utility or a good in two forms: (i) Marginal Utility and (ii) Total Utility. Marginal utility means the additional utility or satisfaction derived by a consumer from the consumption of an additional unit of a product. The sum of utilities derived from consumption of each of the units constitutes total utility.

Value: The term value is used in two different senses. Firstly, it is used to convey the usefulness of goods to their users or consumers. In this sense, it has utility for the users and is therefore, useful to them. Such a value is called the use value of a product.

> **FOR MORE CLARITY!**
>
> In economics, the **marginal utility** of a good or service is the utility gained (or loss) from an increase (or decrease) in the consumption of that good or service. Economists sometimes speak of a **law of diminishing marginal utility**, meaning that the first unit of consumption of a good or service yields ore utility than the second and subsequent units.
>
> The concept of marginal utility played a crucial role in the marginal revolution of the late 19th century, and led to the replacement of the labour theory of value by neoclassical value theory in which the relative prices of goods and services are simultaneously determined by marginal rates of substitution in consumption and marginal rates of transformation in production, which are equal in economic equilibrium.

Secondly, a product has a value in the sense that it can be exchanged or sold against something else. The price for which it can be sold is termed its exchange value.

The use value of a product depends upon the intensity of the want/wants being satisfied by it. For that reason, necessities of life like water have high use-value for the initial doses. But if they are quite abundant, their marginal use-value or marginal utility decreases to a very low level. The exchange value of a product, on the other hand, is influenced by its cost of production, and its scarcity in relation to its demand. It is for this reason that some goods like diamonds and gold have high exchange value.

Wealth: The concept of wealth has different meanings in different contexts. In essence, it represents the sum total of all usable resources available. Wealth of an individual, therefore, comprises not only his landed property and all belongings, but also his money balances and other financial assets. In the case of an economy, however, the concept of wealth has a different coverage. All the natural resources of the country, whether owned by the government or other economic entities, form part of its wealth. From this point of view, national wealth also includes human wealth represented by the size, health, education and training of the population, its moral character and attitude to work. National wealth also includes man-made resources like machinery and equipment, buildings, roads and bridges and so on. You should remember that financial wealth of an individual does not form a part of national wealth since claims of one set of people get cancelled by liabilities of the other.

Goods: The term goods include services also. All items are goods if they have utility, or if they can be used for further production of the goods and services. Goods can be classified in various ways. Those goods which are meant for satisfying wants of individuals and households are called **Consumption goods.** On the other hand, those goods which are used for producing goods/services for sale are called **Intermediate goods.** They are 'Inputs' of production. When they are usable more than once for production (such as machinery and equipment), they are known as **Capital goods.** Examples of intermediate goods are raw materials, coal, machines, hand tools, etc. used by manufacturing industries; or seeds, fertilizers, and pesticides used by agriculturists. It should be remembered that the same goods may shift from the category of consumption goods to that of intermediate ones and vice versa depending upon the purpose for which they are used. Thus, a car used by its owner for his private use is a consumption article but used as a taxi, it becomes a capital or an intermediate product. LPG being supplied to households is a consumption good while CNG being used in transportation is a capital good.

CONSUMPTION GOODS	INTERMEDIATE GOODS	CAPITAL GOODS
Those goods which are used to satisfy consumers desires	Those goods which are used for producing goods/services for sale	Those goods which help in production of more goods E.g.- Machinery

Figure 2.1: Types of Goods

Goods are also classified on the basis of the type of wants satisfied by them. Those goods which satisfy our basic wants like hunger, protection against heat and cold, or meet certain social obligations are called **'Necessities'.** Wants being satisfied in this case are quite intense and, therefore, necessities have a very high utility. If we come to wants with somewhat lower intensity, then the goods needed for their satisfaction are classified as '**Comforts'.** Use of comforts normally increases our working capacity and productivity. Similarly, **Luxuries** are those goods whose consumption is directed to the satisfaction of least intense wants. Such wants are satisfied mainly for reasons of social prestige, etc. In general, an individual give first preference to necessities followed by comforts and luxuries. You should remember, however, that the same goods may be a luxury for some individuals, comfort for others and necessity for some others. Moreover, with the passage of time, the needs of even the same individual can change leading to a reclassification of goods for him.

Demand: As you know, at different prices, the buyers are ready to buy different quantities of the goods in question. Demand for goods, therefore, has a meaning only when the price is mentioned along with the quantity to be bought, and the buyer so have both the willingness and the ability to pay the price. Normally, the demand for goods falls when their price rises or vice versa. However, under special circumstances and for certain goods this may not happen. Generally, when the price of goods is expected to change, its demand also changes in the same direction. For instance, during a period of scarcity, the demand for food may increase with an increase of price, since consumers being afraid of its not being available, would like to stock more than their normal requirement. They fear that the food prices would go up further. Similarly, diamonds, jewellery and other fancy goods are bought by a buyer primarily to show off his wealth. Therefore, the demand for goods of this variety goes up when their prices rise. Consumer's demand for a commodity is not influenced by only its price. There are other forces also at work.

Supply: The concept of supply of goods is associated with their availability. The producers and stockiest of goods are ready to offer different quantities of some goods for sale at different prices. Supply of goods is, therefore, the quantity offered for sale at a specified price. Clearly, the amount of supply changes along with its price. Normally, supply increases with increase of price and decreases with fall of price. However, supply of goods may change even at a given price if their cost of production changes. If the economy enters a phase of recession or depression, supply increases with fall of price

since the sellers expecting a further fall of price would like to dispose of their stocks.

Consumption: Just as the term production denotes the creation of utility in some form or other, consumption denotes the using up of that utility in satisfying some want or for the process of production. Destruction of utility is not consumption. In a modern economy, consumption of goods and services is preceded by their purchase in the market by spending some money. Therefore, very often expenditure for buying consumption goods is referred to as **Consumption expenditure** or simply, **Consumption.** In this context, the consumption is distinguished from investment which denotes expenditure for the purpose of business which either increase our capacity to earn or to produce or create durable assets. But consumption itself is taken to be represented by non-business expenditure. In other words, investment expenditure may be in the form of what is usually called working capital i.e., for operating the existing productive capacity, or it may be in the form of what is usually called fixed capital i.e. addition to productive capacity.

Exchange: Economic entities of economic activity viz., individuals and households, firms or business units, and organs of government etc., undertake a variety of economic activities. You are already familiar with some of them, like production and consumption. Exchange is also an important economic activity. When an economic entity provides goods or services in return for some other goods or services, the transaction is referred to as **Exchange**. To put it in different words, goods/ services are sold against other goods/services. The sale may also be against some amount of money. When exchange is between goods and services, it is known as a **Barter transaction** or a **Barter sale** or simply **Barter.** And when goods/services are sold against money, it is a **Money exchange.**

Exchange is the basis of all economic activity. In any type of economy, no individual or a group of individuals can be self-reliant or independent of others. The underlying principle of economic activity, as put by John Hicked is "You do this for me, I will do that for you". This type of exchange is a win-win situation, i.e. all the parties engaged in exchange will be better-off with exchange, then without it.

Why should an exchange take place? This question can be answered by looking at the exchange activity from the view of a buyer. If the buyer is a consumer, then the item brought has a greater utility for him than the utility of the item paid as a price. If the buyer is a trader, he hopes to get a higher price for the item when it is resold by him. Similarly, if the purchased item is an input for some production, the buyer hopes to get a larger return in the form of sales proceeds of the product. In all these cases, however, exchange is always voluntary and both the transacting parties (buyer and seller) hope to gain out of it. For this reason, it is often said that exchange is not robbery. However, you should remember that the benefit of transacting party may be small or large depending upon the bargaining power of the buyer.

Margin: The concept of margin is an important tool in an economic reasoning, and is used very extensively to describe the behaviour pattern and

decision-making of economic units in their various capacities. The concept is associated with the last unit of a variable under consideration. This point can be clarified by considering some commonly used terms. As you have noted earlier, marginal utility is the utility that is derived from the last unit of a commodity purchased by a consumer. As against this, average utility is the total utility derived from all the units bought divided by the number of units. As an example, consider a case in which a buyer purchases four loaves of bread having 20, 16, 14 and 6 units of utility respectively. Then, the utility of the fourth loaf of bread is the marginal utility and is equal to 6 units of utility. On the other hand, the consumer gets a total of 56 units of utility from all the four loaves and therefore the average utility works out to be 56/4 = 14 units. It is easy to see that any change in the quantity of the goods purchased and other related circumstances would most probably change both the average and marginal utility of a commodity. In either case, remember that marginal utility of an item is the addition to total utility made by its last unit. Correspondingly, in the field of production, we have the concept of **Marginal cost** which is the addition to total cost on account of the last unit of production. Similarly, **Marginal revenue** stands for addition to total sales proceeds when quantity sold is increased by one unit.

The Concept of Normal: In economics, the concept of normal denotes the most common or frequent occurrence. In other words, it indicates what happens in general. It has absolutely nothing to say about the desirability or otherwise of what happens. For example, when we say that normally a firm tries to maximise its profits, we are only stating a fact without implying that it is legally a correct thing to do. The term normal is used to generalize an occurrence or a behaviour pattern. The term is used in another sense also. Economic variables like prices, costs, growth, etc., have long term tendencies to behave in certain specified ways. The level (of price, production, cost, etc.) which a variable tends to achieve is called its normal level (of price, production, cost, etc.). Within a short period, however, a variable often moves away from its normal or long term trend.

2.3 ECONOMY AS A SYSTEM OF CIRCULAR FLOWS

You have already studied that the economic system is a set up for increasing and effective utilization of productive resources. You are also familiar with the decision-making economic entities viz., individuals and households, business units and organs of government. These economic entities undertake economic activities like consumption, production, investment, exchange, etc. These activities are not haphazard. They follow a certain pattern. They get coordinated with each other and the economy begins to operate in an orderly manner. The study of the economic activities and the economy which they create reveal that the economic activities obey certain laws or rules. They are responsive to various forces and stimuli, and therefore their decision-making and activities can be standardized. That is to say, they are not haphazard but have enough consistency to be stated in the form of generalization and economic laws. Viewed this way, an economy can be said to be a system so

that its working can be understood in terms of some laws. It brings into existence a set of exchange transactions that can be grouped into circular flows of goods and services.

The concept of an economy as a system of circular flows can be understood by considering a simplified picture. As a first step, you may consider an economy which has only two categories of economic entities: 1) households (including individuals), and 2) business units. The households are the consuming units of the economy. All the consumption goods are used by them. They are also the owners of all the means of production including those with the business units—since the households own the business units as well. The business units, on the other hand, are the producing units of the economy.

In this set up, the households sell their means of production including labour to the business units, and get in return goods and services produced by the business units. This way a circular flow is established between these two sets of economic units i.e., household and business units. Business units also sell goods and services to each other. Output of one set of producers becomes the input for the other. You can find a large number of cases where this happens. For instance, agriculture needs many industrial goods like fertilizers and tractors as inputs. Similarly, industry uses many agricultural goods as raw materials. Also each industry buys quite a few inputs from other industries. In this manner, a number of mini circular flows of goods and services can be established.

These circular flows can be understood more easily if we consider the sale/purchase of goods and services against money. The households sell means of production owned by them to business units and get the remuneration in the form of money. The business units sell their products to households against money. The business units also sell their products to each other.

There are business units and whose job is to borrow the savings of the households and other business units and re-lend the funds to needy economic units. Thus, funds flow from the households to the capital markets by way of: a) fresh loans and investments, and b) debt servicing. Debt servicing means meeting of interest and debt repayment obligations of outstanding loans from the capital market to the households. Similarly, funds move from the capital market to the households by way of: a) fresh loans to households, and b) servicing of existing debts and investments of the households. The business units also invest their surplus funds in the capital markets and borrow from them in case of need. That way, we can explain the circular flow of funds between the capital markets and the rest of the business units.

The circular flows can be more realistic if we bring the factor of government in this discussion. As you know, the government provides a number of services to the society like defence, law and order, justice, and so on. The resources needed for this purpose are obtained in numerous ways, including taxation of households, business units and capital markets, as also by borrowings from all of them. The government may also act like a business

unit and sell some of its services to the public. This way, funds flow from the rest of the economy to the government. Similarly, the government pays to the rest of the economy for buying goods and services, as subsidies and for servicing public debt. The government may also provide loans to households and business units which would supplement the financial flows by way of fresh loans as also by way of their servicing by the non-government units.

We can conclude that there is a strong interrelationship and interdependence of economic units upon each other. In physical terms, this is known as input-output relationship which means that each economic unit gets its inputs from others and pays for them in terms of its output(s). This fact has a very important implication for the economic system. The economy can develop if a large number of economic units start producing inputs and outputs for sale to each other.

Check Your Progress A

1. Distinguish between value in- exchange and value-in-use of goods.

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2. Distinguish between consumption expenditure and investment expenditure.

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3. Distinguish between barter exchange and money exchange.

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4. State whether the following statements are **True** or **False.**

    i)   Utility is an objective thing and can be measured.

    ii)   Marginal utility of goods is the utility derived from their last unit.
          iii)   Use value of a product is the same as its exchange value.

iv) Use value of goods does not change from person to person or over time.

v) Financial resources of a country form a part of its wealth.

vi) Financial resources of an individual form part of his wealth.

i) The price and supply of goods normally move in opposite directions.

ii) The demand and price of goods normally move in opposite directions.

iii) Consumption is the same thing as destruction of utility.

iv) If a consumer buys six oranges, the marginal utility of oranges to him is the utility of the sixth orange.

1. Which of the following is not necessarily a capital good:

(a) A weaving machine in a textile unit

(b) Air-conditioners in a movie theater

(c) LPG Cylinder

(d) A shop in a super-mall.

2. Arrange the following objects in ascending order of utility for you.

(a) A one- third can of Coke offered to you for consumption.

(b) A set of sample papers (almost sure-short) with solutions in economics sent to you on the eve of examination.

(c) A slice of rotten cake

(d) A bottle of perfume as a gift from a friend.

2.4 ECONOMIC METHODOLOGY AND ECONOMICLAWS

Every science has its own analytical technique (tools of analysis), the way it gathers the basic information (data) to be analyzed, and the way its reasoning is carried out, and so on. All these put together are called its methodology. In economics also, a suitable methodology is needed and every economist uses some form of it. In every science, inferences or conclusions are drawn based upon certain causes. These causes may be laid down in the form of imaginary conditions or drawn from observed facts or they may be a mixture of the two. The corresponding outcome is then worked out and the statement depicting the relationship between specified causes and their outcome is termed as the law of that science. Each science has numerous such laws.

In a social science, the subject matter is the behaviour of man within his social set up. The behaviour of persons who live in isolation and away from the society like the "risk is" living in seclusion in mountains is not studied in a social science. The actions (both individuals and collective) of persons living in a society form the areas of investigation of a social science. An effort is made to determine the activities of the members of a society in response to various causes and forces, and the expected behavioural outcome

in response to different sets of causes and forces is then put forth in the form of generalizations. These generalizations are the statements of tendencies and are known as social laws.

Economics being a social science, economic laws are, therefore, a part of social laws. In the words of Alfred Marshall, we should separate that part of behaviour of members of the society where the main motive happens to be an economic one, and that is where the main motive can be expressed in terms of money price. The corresponding activities are then economic activities. However, such a dividing line between economic laws and other social laws is not always clear. Very often an activity happens to be motivated by a combination of both economic and non-economic considerations. As a result, it is often quite difficult to formulate pure economic laws which have full validity also.

2.4.1 Inductive and Deductive Reasoning

Economists have followed two traditions in formulating economic laws. According to one tradition, the causes (also called conditions or assumptions) are specified and different economic units are expected to behave in a rational manner. The outcome in this case is predictable provided the assumptions made are satisfied. The assumptions themselves may be totally unrealistic or may be very close to reality but they are stated in a precise manner. In any case, this type of reasoning is called **deductive reasoning**. In this method, the generalization or law is stated and the individual activities are expected to conform to it. A typical example of deductive reasoning is a the famous law of demand which states that, other things being equal, the quantity of a product demanded varies inversely with its price. When price falls, demand rises and when price rises, demand falls. This you will study in detail in subsequent Units.

As against this deductive reasoning, some thinkers try to discover economic laws the other way round. Instead of laying down causes or conditions on a hypothetical basis, they collect the actual information regarding the behaviour of economic units under different conditions. In other words, empirical information is collected and generalizations regarding the behaviour of economic units under different conditions are worked out. This is called the method of **inductive reasoning.** A well-known example of the use of this method is the Engel's Law. Through a study of family budgets, Engel concluded that as the income of a family increases, the proportion of its expenditure on necessities decreases while that on comforts and luxuries goes up. Most business firms prefer this line of approach.

Both deductive and inductive methods have their merits and demerits. Deductive method helps us in laying down many basic principles of behaviour of man. It provides a theoretical foundation to our reasoning. On the other hand, it may be far removed from reality and totally inapplicable.

Inductive reasoning makes use of actual behaviour pattern of the economic units and is, therefore, expected to depict reality more faithfully. It is for this reason that most business firms undertake empirical investigation to

determine the expected response of consumers to bring change in quality and price of their products or to the way the products are advertised. Knowledge of the response of different sections of the economy such as consumers, investors, farmers, manufacturers, etc. helps the authorities in formulating effective policy measures for achieving their goals. However, inductive reasoning also has its own limitations.

As stated earlier, our economic activities are motivated by both economic and non-economic causes. The economic laws state the effects flowing from changes in economic causes only. However, non-economic causes also keep changing and, therefore, economic laws based upon inductive reasoning need not remain valid in future as well.

In economics, both inductive and deductive methods of reasoning are used to supplement our understanding of an economy and its working. None of them is a perfect and ideal method for all occasions. But used together, they enable us to improve both the analytical techniques. They help us in the advancement of economic science and make it more useful. In the final analysis, they tend to converge together. While inductive approach helps us in selecting more relevant assumptions of deductive reasoning, the latter helps us in interpreting complex reality in a more meaningful manner.

Economic laws suffer from many limitations and so they cannot be used for predictions with certainty. You should remember that these limitations are associated not with the way in which the relationship between causes and their affects works out but with the way the causes themselves are selected. A little elaboration of this statement would help you in understanding the limitations of economic laws much better.

Firstly, you should note that in economics, it is not possible to have controlled experiments as can be done in the case of physical sciences. Economics deals with human beings and their activities which cannot be reduced to responses limited to selected conditions in isolation.

Secondly, our economic activities are affected by a large number of causes. And it is not possible to take into account all of them. Quite often, it is not possible to even identify all the causes. In actual practice, therefore, an economist has to use his judgment in selecting what he considers the most important cause and try to find out response of economic units to it.

Thirdly, it often happens that before the final outcome is available, the causes themselves undergo a change. Some causes cease to exist, and new ones appear. Examples of changing causes can be the imposition of or withdrawal of a tax on a commodity, a strike by labour producing that item, the discovery of a substitute item, and so on.

2.4.2 Ceteris Paribus

It is for these reasons that every economic law has to be stated with some conditions or qualifications. It is accompanied by the words, **ceteris paribus** which means 'other things, being equal'. Even when these words are not stated explicitly, they are supposed to be there. The statement of this

condition means that once the said causes start working, they are not disturbed by any outside force till the final outcome. You should note that even in other sciences also, this condition is always there in an explicit form. In other sciences, the ceteris paribus frequently holds or can be made operative under laboratory conditions. But in economics, this condition is not satisfied. You cannot conduct economic experiments under controlled conditions. Since economic laws are the statements of economic activities in response to various forces, the economists use certain guiding principles under which the response is supposed to come into existence. One such guiding principle is that every economic unit decides about its response to various causes on the criterion of rationality. It means that the response is determined in such a way that it is expected to serve the interest of the responding units in the best possible manner. For example, for a given amount of expenditure, a consumer is supposed to aim at getting maximum possible utility from his purchases. A monopolist is expected to choose that quantity of output and fix that price for his product which brings him maximum profit.

While formulating economic laws, the next guiding principle is as follows. It is assumed that every economic unit, guided by the motive of rationality, tries to achieve optimality, that is the best attainable position. Optimization means that a criterion or objective is located and an effort is made to achieve it or to come as close to it as possible. Two examples of such criteria are maximising the profit, and minimising the cost of production. In actual practice, a criterion may not be achieved on account of some handicaps.

2.4.3 Equilibrium

The concept of equilibrium is an important tool of analysis in economics. It is very frequently used and you should become familiar with it. Usually, an economic variable (such as the price of a commodity) is subject to various forces trying to pull it in different directions. When these forces are in balance, the value of variable stops changing and it is said to be in equilibrium.

Check Your Progress B

1. Distinguish between deductive reasoning and inductive reasoning.

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2. Define the concept of optimization.

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3. State whether the following statements are **True** or **False.**

   i) Economic laws can be used to make exact predictions.

   ii) An economic law is a statement of economic activities in response to various forces and the results thereof.

   iii) Inductive reasoning is based upon a study of observed facts.

   iv) Deductive reasoning is based upon specified causes.

   v) In deductive reasoning, all the assumptions are unrealistic.

   vi) It is always possible to distinguish economic laws from the rest of social laws.

   vii) Economic laws are not as exact of those of physical sciences.

   viii) Every economic law is accompanied by the qualification ceteris paribus.

   ix) An economic variable is in equilibrium when the forces determining it are in balance with each other.

2.5 POSITIVE VERSUS NORMATIVE ECONOMICS

You know that economics is a social science and it studies the behaviour of human beings in relation to the satisfaction of their material needs. In this context, there has been a difference of opinion as to whether study of economics should be confined to only facts and theoretical reasoning or it should be used for improving the working of the economy and material well-being of the members of the society.

The term **positive economics is concerned with only formulating economic laws and describing reality.** The economic laws may be derived from theoretical assumptions or from recorded facts. Either way, they only tell us what exists. They do not pass any judgement as to whether the findings of economic analysis are desirable or need a modification.

As against this, **normative economics realizes the fact that an economy is never perfect. The outcome of its working can always be improved upon.** It is quite normal to find an economy faced with many problems requiring immediate attention. Such problems can be related to price changes, employment, scarcity of certain inputs, inequalities of income and wealth, and so on. In normative economics, the knowledge gained is put to use for improving the working of the economy. Targets of improvement are laid down and policy measures are formulated by which the targets are to be achieved. Thus, normative economics is concerned with what ought to be. It is applied economics. Study of economics becomes fruit-bearing, that is, it is used as an art for achieving certain goals. By its very nature, normative economics involves the use of value judgment, that is, deciding what is good and desirable as against what is bad and to be avoided. A particular problem faced by normative economists is that it is often not possible to have a set of commonly agreed goals. Consequently, in line with his preferences, each

economist may prescribe a different set of remedial measures. You should remember that in both positive and normative economics, we make use of propositions, theories and laws. Moreover, in positive economics we stop at their derivation while in normative economics we use them for achieving chosen goals.

The argument in favor of normative economics is that we are concerned with our material well-being and we must try to improve our lot and the working of the economy. Accordingly, we should not study economics for its own sake. Instead we should put economics to a practical use and therefore prefer normative economics to the positive one.

A positive statement

"An increase in price of petrol leads to a fall in its quantity demanded."

A normative statement

"Government should take steps to cut the consumption of Petrol"

More generally, normative statement uses the verb "should"

2.6 MICROECONOMICS AND MACROECONOMICS

The terms microeconomics and macroeconomics are used in connection with the level of aggregation, that is the extent to which economic units and variables are covered in economic analysis. At one end, the analysis may cover the behaviour and responses of a single economic unit and at the other extreme it may cover the entire economy. These two terms (micro and macro) are derived from Greek words 'mikros' and 'makros' which mean small and large respectively.
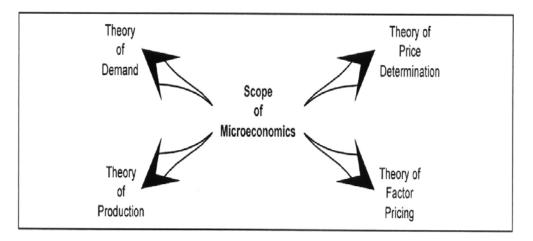
Microeconomics deals with the behaviour of individual elements in an economy such as the determination of the price of a single product or the behaviour of a single consumer or business firm. You may take the example of a typical individual consumer of a certain good.

In microeconomics, you try to find out change in his demand for goods in response to the price of those goods, prices of other

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For More Clarity!

Microeconomics (from Greek prefix micro meaning "small" + "economics") is a branch of economics that studies the behaviour of how the individual modern households and firms make decisions to allocate limited resources. Typically, it applies to markets where goods or services are being bought and sold. Microeconomics examines how these decisions and behaviours affect the supply and demand for goods and services, which determines prices, and how prices, in turn, determine the quantity supplied and quantity demanded of goods and services.

goods, his own income, his tastes and so on. Similarly, in microeconomics the determination of price of an individual good is studied. The determination of the price per unit of a factor of production also forms a part of microeconomics.

As against this, macroeconomics covers large aggregates or collection of economic units which may extend to the entire economy. In the words of Kenneth Boulding, "**Macroeconomics covers the great aggregates and averages of the economic system rather than individual items**". Here we study collections of variables and economic units (i.e., macro variables) such as national income, employment, level of prices in general, intersectional flows of goods and services, total savings and investment, and the like. **While the study of an individual firm or an industry lies within the scope of microeconomics, an entire sector falls within the scope of macroeconomics.**

To use a metaphor, macroeconomics studies elephant as one object; microeconomics (like five blind men in a folk tale) studies individual parts of a whole body. Each study leads to different result or, to use another metaphor, one enjoys the macro view of a cricket test match while one enjoys a ball-by-ball description when sitting in before a TV.

Complementarily of Microeconomics and Macroeconomics: Both microeconomics and macroeconomics have a place of their own and none can be dispensed with. It is useful to study both.

Firstly, a modern economy is a highly complex system in which a very large number of forces are at work in an interdependent manner. It is not possible to take into account all of them simultaneously. For studying it in bits and parts and then 'move on to the study of the economy as a whole, the necessity of studying individual units and their small groups establishes the usefulness of microeconomics.
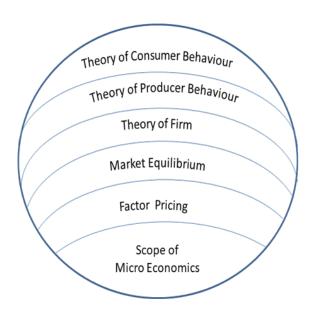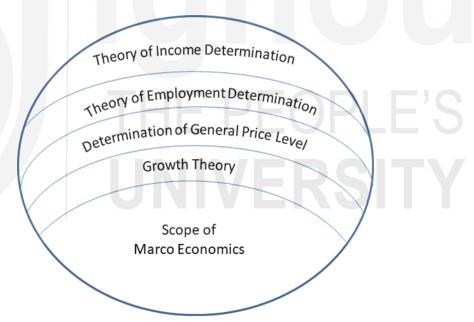
Figure 2.2: Scope of Microeconomics

Secondly, the necessity to study the working of the economy as a whole establishes the usefulness of macroeconomics. Health and prosperity of the constituent elements of the economy (i.e., the individual economic units and their groups) can be ensured only if the performance of the economy as a whole is excellent.

Figure 2.3: Scope of Macroeconomics

However, you should remember that it is not always possible to extend the conclusions of microeconomics to macroeconomics without modifying them. This is because in many cases the outcome of the activities of individual economic units cannot be added up. Instead, they come in conflict with each other and modify the final result. For example, if an individual increases his savings by reducing his expenditure, he adds to his accumulated wealth. But if everyone does so, there would be a fall in demand and prices. Consequently, output may also fall. Similarly, an individual can buy more of a commodity at a given market price. If a large number of such individuals try to buy more, the price would go up. Take the example of bank deposits.

An individual deposit holder can close his account with the bank and withdraw the entire deposit. If all the depositors try to do so, the bank will not be able to pay them all and may even fail.

To sum up, it may be stated that microeconomic behaviour cannot be added up in a linear fashion to derive macroeconomic behaviour. There may be conflict among the units as stated above. However, the study of microeconomic unit does help in many situations to understand a macroeconomic phenomenon. For instance, there is wide spread sickness in Indian small scale industry. To comprehend this phenomenon, it is important to study the causes of sickness of individual units, formulate a set of causes, identify major causes and then suggest remedial action.

2.7   STOCKS AND FLOWS

Economic variables are of two kinds: 1) Stocks, and 2) Flows. **A stock variable is the one which can be measured only with reference to a point of time and not over a period of time. As against this, a flow variable is the one which can be measured only with reference to a period of time and not a point of time.** You have already come across numerous economic variables which belong to one category or the other. Take the examples of the supply of money and magnitude of wealth. They have reference to point of time. They are, therefore, 'stock' concepts. Correspondingly, examples of flow variables are production, saving, expenditure, income, sales, purchases, etc. All these variables can be measured only over a period of time. A factory can produce so much during, say, a month and not at a given moment of time. A person does not have an income at a point of time. But he has it only for a period of time. A flow concept can assume some value only with the passage of time, not otherwise. You are already familiar with the concepts of demand and supply. These two are also flow variables. Demand for goods is always its quantity which the buyers would like to buy at a stated price during a given period of time. Similar is the case with supply. You would note that **stock and flow variables are often used together in economic analysis.**

2.8   STATICS AND DYNAMICS

These two terms differentiate different techniques of economic analysis. In static analysis (also called static economics), the basic elements of the economic system are taken to be given and non-changing. They are known **as parameters of the economy** and include population, tastes, techniques of production, the organisation of the markets, and so on. With given parameters, an equilibrium position is selected and one or more specified variables are allowed to change subject to the usual condition of **ceteris paribus.** They are allowed to work out their effect to a new equilibrium position. The technique of estimating new equilibrium position subject to the two conditions mentioned viz., a) no change in parameters, and b) ceteris paribus, is called **static analysis or static economics.** Since in this technique two equilibrium positions are compared, it is also known as comparative static. In a refined form of this technique, the condition of a fixed parameter

is removed, but parameters are allowed to change only at predetermined rates so that it is still possible to work out the position of new equilibrium whenever any change is initiated in the original equilibrium position.

In contrast, in dynamic economics or dynamic analysis both the parameters of the economy and other things are allowed to change in a non-predictable manner. As a result, it is no longer possible to work out the new equilibrium position on the basis of initial equilibrium conditions. In dynamic analysis, therefore, the changes in the economy take place at rates which themselves keep changing in a non-predictable manner. The only way by which the new position of a variable in the economy, as compared with its initial position, can be found out is by tracing the path of change, that is by following each state of change and accommodating any variation in all the determining causes.

You should note that in reality, almost every economic system happens to be a dynamic one--it keeps changing in a non-predictable manner. It is more so in the case of modern economics where there is a continuous effort to accelerate the process of its growth and where it is exposed to effects from the rest of the world. Still, the technique of static analysis has its advantages. It teaches an analyst how each variable should be taken into account.

2.9   OPPORTUNITY COST

The term opportunity cost refers to the cost of getting something in the form of losing something else in exchange. Every gain to the economy as a whole or to an individual economic unit has an opportunity cost. This fact has its origin in the shortage or scarcity of resources in comparison with their needs. The concepts of opportunity cost can be illustrated in many ways. For a consumer, the opportunity cost of buying an item shows itself in the form of the price which he pays for it in money terms. But in the final analysis, it is the goods and services which he cannot get because he chose to buy that item. In the same way, when somebody saves a portion of his income, then the opportunity cost of that saving is the sacrifice of current consumption. In contrast, the opportunity cost of current consumption is the loss of similar consumption in future which would have been possible through saving now and spending later. For a lender, the opportunity cost of yield from investing in one form of financial assets is the loss of yield from the next best alternative investment. For a factor of production, the opportunity cost of earnings from the existing employment is the loss of earnings from the next best available employment. This is also known as the transfer earnings of that factor of production. For a producer, the opportunity cost of producing an item A is the corresponding loss of what could have been produced otherwise.

Opportunity cost is opportunity lost!

Thus, the concept of opportunity cost is a comprehensive and wide one. It is applicable to the length and breadth of our economic activities because with limited resources we cannot produce and get everything. Opportunity costs, measured in different contexts, manifest themselves in different ways such as money cost, the loss of alternatives output the loss of alternative income yield the loss of alternative utility and so on. Moreover, while in some cases it may be possible to express opportunity cost in terms of money, in others it may not be so.

The concept of opportunity cost is equally applicable in the case of the economy as a whole. An economy cannot produce everything it wants and must choose to produce selected goods and services at the cost of others. You are already familiar with the concept of production possibility curve (Unit 1) in which you noted the fact that an additional production of LED means a corresponding reduction in the production of Computer monitor. However, remember that the opportunity cost of an item is not always a fixed one. Normally, it keeps increasing when the quantity of an item increases. Of course, other influencing causes also are at work and bring about a change in the opportunity cost of any item under consideration.

Check Your Progress C

1. State whether the following statements are **True** or **False**.

    i) Positive economics is concerned with what ought to be.

    ii) Normative economics requires a system of value judgment for recommending policy steps.

    iii) Every economist prescribes the same remedies for a particular economic problem.

    iv) Positive economics always depict reality.

    v) We can always extend the conclusions of microeconomics to the field of macroeconomics.

    vi) Demand and supply are both stock variables.

    vii) In comparative statics, a comparison of two equilibrium positions is made.

    viii) The statement, that every gain to the economy as a whole or to an individual economic unit has an opportunity cost, is often not true.

    ix) Opportunity cost to the economy of producing an item is always a fixed one.

2. Match the item in Column A with those in Column B

	Column A	Column B
i)	Study of individual firm and industry	a) Barter
ii)	A variable which can be measured at a point of time	b) Macroeconomics

iii)	Study of an entire sector of an economy	c) Marginal utility
iv)	A variable which can be measured over a period of time	d) Ceteris paribus
v)	Want satisfying capacity of a good	e) Flow variable
vi)	Satisfaction yielded from consuming one additional unit	f) Microeconomics
vii)	Other things being equal	g) Utility
viii)	Exchange of apples with eggs	h) Stock variable

2.10 LET US SUM UP

In economics, there are a number of terms and concepts like utility, value, exchange, wealth, goods, supply, demand, consumption, margin, etc., which form a part of popular economic vocabulary.

The economy can be viewed as a system of circular flow of goods and services. These circular flows take place between different sectors of the economy such as households, business units, government, etc. Each economic units gets its inputs from others and pays for them in terms of its output(s). This fact has a very important implication for the economic system. Economic laws are formulated to depict the activities of economic units in response to various causes and forces. They are statements of tendencies. Since they deal with the behaviour of human beings as members of the society, they are a part of social laws.

Economic laws are formulated on the basis of deductive or inductive reasoning. In the deductive approach, assumptions or causes are selected and conclusions are derived by reasoning. The causes or assumptions may or may not depict reality. On the other hand, in inductive reasoning, facts are gathered and an effort is made to discover the actual behaviour pattern of economic units in response to various forces and stimuli. Both approaches should be used to refine and strengthen economic laws and understand the working of an economy.

Since it is not possible to have controlled experiments and the human behaviour is subject to an unpredictable change, economic laws cannot be used for reliable predictions. Moreover, the reality is so complex that it is not possible to take all the operative causes into account while formulating economic laws. Furthermore, in most cases, before the final outcome is realised, some outside forces disturb the process. It is for this reason that the statement of every economic law carries the qualification **ceteris paribus** or **other things being equal.**

The term positive economics denotes that part of economic analysis which just describes reality (or theoretical reasoning) without stating the desirability

or otherwise of the findings. Normative economics, on the other hand, is concerned with what ought to be. It views reality in the light of chosen goals of society and suggests ways and means of achieving them.

The term "microeconomics' and 'macroeconomics' are used in connection with the level of aggregation, that is, the extent to which economic units and variables are covered in economic analysis. **Microeconomics** studies the economic activities and responses of individual economic units and their small groups. **Macroeconomics** covers large collections of economic units, their aggregates and averages and macro variables like national income, employment, and so on. Both microeconomics and macroeconomics have a place of their own and both should be studied.

Economic variables can be classified into stocks and flows. **A stock variable** is the one which can be measured only with reference to a point of time. A **flow variable**, on the other hand, is measurable only over a period of time. Frequently, a simultaneous use of both types of these variables is needed.

Static economic or comparative statics is a technique of analysis in which the parameters of the economy are taken to be given. The assumption of ceteris paribus is made and the initial and final equilibrium positions are compared. In dynamic economics or dynamic analysis, parameters of the economy are allowed to change and the condition of ceteris paribus is dropped. In this analysis, the position of a variable, compared with its initial position, can be found out only by tracing the path of change.

The opportunity cost of an item is the loss of something else in the process of gaining it. The concept is applicable to every aspect of an economic system. Opportunity costs manifest themselves in the form of money cost, the loss of alternative output, the loss of alternative income-yield etc. The concept is applicable at both micro and macro levels.

2.11 KEY WORDS

Average Utility: Total utility divided by the number of units of the goods.

Barter: Exchange of goods/services against other goods/services.

Ceteris Paribus (Other Things Being Equal): Is a condition attached to the statement of every economic law and means that no outside force would disturb the process before final outcome is reached.

Comforts: Goods which are used for increasing our productive capacity and for making our lives more comfortable.

Consumption: Using up of Utility of goods in the satisfaction of a want.

Deductive Reasoning: The technique of analysis in which the causes or assumptions are selected and results derived.

Demand: The amount of goods which the buyers are ready to buy, per period of time, at a given price per unit.

Dynamic Economics (Economics Dynamics): A technique of analysis in which both the parameters of the economy and other things are allowed to change in a non-predictable manner. The position of the variable under consideration can be estimated only by tracing the path.

Economic Laws: Statements of tendencies which depict the standardized or generalized response of economic units to different forces and stimuli.

Exchange Value: The price which an item commands in the market Flow

Variable: A variable which can be measured only with reference to a period of time.

Goods: Items which have a utility or can be used for the production of other goods or services.

Inductive Reasoning: The technique of analysis in which factual information is used to discover the behaviour pattern of different economic units in response to various forces and stimuli

Intermediate Goods: Inputs used for production.

Luxuries: Goods which are meant for status or social standing.

Macroeconomics: Branch of economic analysis that focuses on the workings of the whole economy or large sectors of it.

Margin: The value of the variable under consideration related to the last unit of an item.

Marginal Utility: The additional or extra satisfaction yielded from consuming one additional unit of a commodity.

Methodology: Represents the tools of analysis, the collection of and use of basic information, and the way reasoning is carried out.

Microeconomics: Branch of economic analysis that focuses on individual economic units or their small groups and micro-variables like individual prices of individual commodities, etc.

Money Exchange: Sale of goods/services against money.

Necessities: Goods which are used for satisfying basic wants of existence.

Normal: Denotes the most common or frequently occurring or the long-term tendency of a variable.

Normative Economics: That part of economic analysis which is concerned with what ought to be, and the way it can be achieved by changing the existing situation.

Opportunity Cost: The value of the next best use (or opportunity) for an economic item, the value of the sacrificed alternative.

Positive Economics: That part of economic reasoning which covers what is, without going into its desirability or otherwise, and without suggesting ways for changing the existing state of affairs.

Static Economics (Comparative Statics): A technique of analysis in which the initial and final equilibrium positions are compared on the assumption that basic elements of the economic system (called the parameters of the economy) do not change.

Stock Variable: A variable which can be measured only with reference to a point of time.

Supply: The quantity of goods which the sellers are ready to sell, per unit of time, at a given price per unit.

Total Utility: The total satisfaction derived from all the units of an item.

Use Value: Utility of goods.

Utility: The want satisfying capacity of goods. It the service or satisfaction an item yields to the consumer.

2.12 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress A

1. i) False ii) True iii) False iv) False v) False vi) True vii) False viii) True ix) False x) True xi) False

Check Your Progress B

2. i) False ii) True iii) True iv) True v) False vi) False vii) True viii) True ix) True

Check Your Progress C

1. i) False ii) True iii) False iv) False v) False vi) False vii) True viii) False ix) False

2. i) f ii) h iii) b iv) e v) g vi) c vii) d   viii) a

2.13 TERMINAL QUESTIONS

1. Distinguish between positive and normative economics. Which one should be preferred and why?

2. Write short notes on the following:

   a) Concept of Equilibrium

   b) Limitations of Economic Laws

   c) Ceteris Paribus

   d) Tracing the Path of Change

3. Distinguish between:

   a) Microeconomics and Macroeconomics

b) Static Economics and Dynamic Economics

4. State the reasons on account of which almost every modern economy is a dynamic one.

5. In what forms opportunity costs manifest themselves for the consumer, the producer, the investor, and a factor of production?

> **Note : These questions will help you in understanding the unit better. Try to write answers for them. But do not send your answers to the University. They are for your practice only.**

BLOCK 2

CONSUMER BEHAVIOUR AND THE DEMAND THEORY

BLOCK 2 CONSUMER BEHAVIOUR AND THE DEMAND THEORY

In Block 1 you have learnt the concept of economic system, basic economic laws and various forms of economic system. This block deals with the law of diminishing marginal utility and Equimarginal utility, the various analysis of indifference curve, law of demand and elasticity of demand.

Unit 3 explains the concept of Demand, it's nature, its determinants, the law of demand, its application, change in demand and change in quantity demanded.

Unit 4 deals with the meaning of utility, comparative analysis of total utility, average utility and marginal utility, the law of diminishing marginal utility, law of equimarginal utility and the concept of consumer's surplus.

Unit 5 explains the concept of indifference curve, meaning of budget price line, derivation of price consumption curve, split up price effect into income and substitution effects and measurement of consumer's surplus with the help of indifference curve.

Unit 6 deals with the meaning and factors influencing the demand, the law of demand, identification of the movement along the demand curve and the use of law of demand for government policy on pricing.

Unit 7 explains the concept of elasticity of demand, price elasticity of demand, income elasticity of demand and price cross-elasticity of demand, types of elasticity, measurement of elasticity of demand, determinants and importance of price elasticity of demand.

Unit 8 outlines the shortcomings of Marshallian utility analysis of consumer's demand behaviour, concept of a scale of preferences, indifference curve, enumerates the properties of indifference curves, derivation of income consumption curve, derivation of price consumption curve, distinguish between income effect, substitution effect and price effect, derivation of consumer's demand curve.

UNIT 3   CONSUMER DEMAND

Structure

3.0   OBJECTIVES

After studying this unit, you should be able to:

* define demand;

* distinguish between want and demand;

* list the factors influencing demand for a commodity;

* explain the difference between demand for a commodity;

* for a consumer and for a market describe the law of demand;

* explain the law of demand with the help of a demand schedule and the demand curve;

* explain the reasons for the operation of the law of demand;

* identify the movement along a demand curve and a shift of the demand curve; and

* discuss the use of the law of demand for government policy on pricing.

3.1   INTRODUCTION

In this unit you will learn about the law of demand with the demand schedule and a demand curve. You will also learn the factors influencing demand of a commodity, the operation of the law of demand and its usefulness to the government in fixation of the prices of commodities.

Satisfaction of human needs is the basic end and goal of all production activities in an economy. As observed earlier, human wants are unlimited and recurring in nature, whereas means available to satisfy them are limit. Therefore, a rational consumer has to make an optional use of available resources. The demand theory provides a framework within which these decisions have to be made.

But before we talk about the demand theory, we take a little digression. We explain in brief the nature of cause-and-effect relations in economic analysis.

3.2   CAUSE AND EFFECT RELATIONSHIP

The foundation of economic analysis is cause-and-effect relationship (also called causal relationship).

Examples

If the price of a commodity falls, quantity demanded of a commodity will rise; conversely, if the price of a commodity rises, its quantity demanded will fall.

In other words, price of a commodity and its quantity demanded move in the opposite direction; i.e., there is inverse relationship between the price of a commodity and its quantity demanded. Well, based on this relationship we make the following propositions.

Since there is inverse relationship between the price of a commodity and its quantity demanded, an increase in quantity demanded would result in a fall in the price of the commodity.

Before we proceed further, we reflect on this proposition. Is it true or false?

Let us keep this dialogue on hold and proceed to talk about these relationships:

Proposition – 1: If you wear high-heel shoes you look taller.

Therefore, if you are taller, you must be wearing high-heel shoes.

Proposition – 2: If it rains heavily, low-lying areas get flooded.

Therefore, whenever a low-lying area gets flooded heavy rains must have taken place.

Do you agree with the results following from proposition 1 and proposition 2?

The correct answer in both cases is:

NO

We will explain this with reference to situation of price – quantity demanded relationship given above.

A causal relationship explains the relationship between two variables (i) a cause variable, and (ii) an effect variable. Cause variable is also known as an independent variable. Effect variable is known as dependent variable.

Change in dependent variable depends upon changes in the independent variable; quantity demanded is a dependent variable. This relationship can be stated as follows:

Quantity demanded depends upon the price of a commodity.

This can also be stated as follows:

Qd = f (p)

This is read as; quantity demanded is a function of (which means depends upon) the price of the commodity.

If P changes (cause), then Qd will also change (effect).

We cannot reverse this relationship. If we reverse this relationship, we will land ourselves in trouble. A blue shirt looks beautiful, but it does not mean every beautiful shirt would be blue. If it is cold outside, then people like to stay indoors. But it does not mean that if people are staying indoors it must be cold outside.

In economic analysis we generalize these relationships as follows:

x = f (y)

Where, x stands for a dependent variable and y for an independent variable.

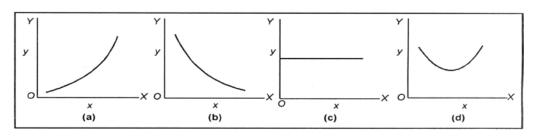x = f(y) and x bears an inverse relation to y, which of the following figures is correct?

Fig. 3.1

Ans.   Fig 3.1 (b)

3.3   THE NATURE OF DEMAND

At first we should distinguish between want and demand. The want of a commodity is just a wish on the part of the consumer to possess a

commodity. This want is not necessarily backed by the purchasing power to buy the commodity. It is like window shopping where irrespective of the money possessed by a consumer he/she goes around in the market and wishes to get the commodities for consumption or for accumulation purposes. The demand of the commodity, on the other hand, is the wish of the consumer to get a commodity, backed by the sufficient purchasing power. In economic theory we are concerned with the demand of the commodity rather than with the want of the commodity. The amount of a commodity that consumers wish to purchase backed by the purchasing power, is also called the quantity demanded of that commodity.

There are three important points about the quantity demanded which should always be kept in mind. Firstly, it is the quantity demanded which is desired to be purchased by the consumers which we consider rather than the quantity which the consumers actually succeed in purchasing. Thus, quantity demanded is the desired purchases and the quantity actually bought is referred to as actual purchase. Secondly, quantity demanded is always considered as a flow which is a variable measurable over a period of time. Thus, for instance, when we say that demand or quantity demanded of oranges is 10, it must be per day or per week etc. We are never interested in a single isolated purchase but with a continuous flow of purchases. A problem may arise when we talk of the purchase of a durable consumer commodity like a car or a stereo system etc. Durable consumer commodities purchased at a point of time may not look like a flow. The new the problem can be overcome if we consider the service rendered by a durable consumer commodity. For example, if a stereo system is purchased, it may have an expected life of say 5 years or 60 months. Thus, the consumption of a stereo system which has an expected life of 60 months is 1/60 a month. If a stereo system costs say Rs. 10,000 then in money terms the consumption of a stereo system is Rs. 10,000/60 = Rs. 166.6 per month.

Thirdly, the quantity demanded of a commodity has an economic meaning only at a given price. For example, to say that the quantity demanded of oranges is 10 units over. a week has no meaning unless we specify the price of oranges per dozen or per unit. In short, the demand for oranges equal to 10 units per week at a price of Rs. 12 per dozen is a full and meaningful statement, as used in micro-economic theory.

> **FOR MORE CLARITY!**
>
> Consumption is a common concept in economics, and gives rise to derived concepts such as consumer debt. Generally, consumption is defined in part by comparison to production. But the precise definition can vary because different schools of economists define production quite differently. According to mainstream economists, only the final purchase of goods and services by individuals constitutes of consumption, while other types of expenditure—in particular, fixed investment, intermediate consumption and government spending—are placed in separate categories. Other economists define consumption much more broadly, as the aggregate of all economic activity that does not entail the design, production and marketing of goods and services (e.g., the selection, adoption, use, disposal and recycling of goods and services).

3.3.1 Different Concepts of Demand

There are different ways in which the term demand can be interpreted. Some of the important concepts of demand are explained below:

i) *Price Demand:* Price demand refers to the different quantities of a commodity which will be bought per unit of time in a market *at different prices.* Other things being equal, more of a commodity is demanded at a lower price than at a higher price.

ii) *Income Demand:* It refers to the different quantities of a commodity which will be bought *at different levels of money income.*

iii) *Cross Demand:* It refers to the different quantities of a commodity which will be bought as a result of change in the *price of related goods.* In case of complementary goods (such as mobile phones and sim cards), demand for one of the two commodities is inversely related to the change in the price of its complementary goods, whereas in case of substitutes *(e.g.,* tea and coffee) it moves in the same direction as the price of its substitutes.

When you demand a TV set you also demand Tata Sky connection. Demand for TV creates demand for its complementary goods.
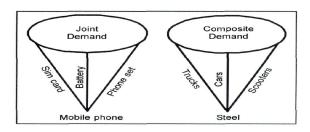
3.3.2 Direct Demand and Derived Demand

If a commodity is demanded for its own use, it constitutes direct demand for the commodity. It is also known as autonomous demand.

Example: Demand for any consumer goods, like shirts, jeans, DVD players, CDs, etc.

On the contrary, demand for factor inputs is derived demand. Software engineers are demanded when there is a demand for software solutions. Thus, derived demand arises from the demand for the products that factor services help to produce.

My desire to purchase a personal helicopter is merely an *ex-ante demand.* It affects nobody as I do not have the ability to pay. No one reacts to my desire. But my desire to purchase a Honda car is *ex-post demand,* if I have the ability to pay for it. Once I express my desire to purchase the car, it sets in motion the whole process of production of the cars.

3.3.3 Joint Demand and Composite Demand

Joint demand for two or more commodities arises when all of them are required in a single use.

One without the others is of little use.

Example: Demand of phone set, sim card, battery and charger together.

This kind of demand arises when a single commodity can be put to two or more uses. It is also known as Composite demand.

Example: The available steel in an economy can be used in production of trucks, cars, scooters, refrigerators, etc.

3.4   DETERMINANTS OF DEMAND

The demand for commodity or the quantity demanded of a commodity on the part of the consumer is dependent on a number of factors.

The factors influencing the demand for a commodity on the part of an individual consumer can be put as:

i)   Price of the commodity

ii)   Prices of other related commodities

iii)   Income of the consumers, and

iv)   Taste of the consumers.

A set of these factors is called a Demand Function. The Demand Function is an expression in which a dependent variable is shown as dependent on independent variables. Suppose, we use symbols to represent the demand for a commodity say X by D_x, the price of this commodity X by P_x, price of commodities other than the commodity X by $P_L, P_M \ldots P_Z$ and L, M…...Z are other commodities, income of the consumer by Y and tastes of the consumer T, then the demand function can be shown as:

$Dx = f (Px, P_L, P_M, P_N \ldots P_Z , Y, T)$

If all the factors influencing the demand for the commodities X are allowed to vary simultaneously the picture would look highly complicated. Therefore, normally what we do is to allow one of the factors to change on the assumption that all other factors remain unchanged, or, as an economist will state it by using the term, 'ceteris paribus' (other things remaining equal).

3.4.1   Determinants of Demand for a Consumer

The demand of a commodity or the quantity demanded of a commodity on the part of a consumer is dependent on a number of factors. Some of the important factors influencing the demand of a commodity are given below:

1) **Price of the commodity:** The price of the commodity has an important influence on the quantity demanded by a consumer. Normally, the higher the price of the commodity, the lower the demand of the commodity. This, as will be explained later, is referred to as the operation of the law of demand. The law of demand is always stated on the assumption that the other factors influencing demand remain constant.

FOR MORE CLARITY!

When income rises, the demand curve for normal goods shifts outward as more will be demanded at all prices, while the demand curve for inferior goods shifts inward due to the increased attainability of superior substitutes. With respect to related goods, when the price of a good (e.g., a hamburger) rises, the demand curve for substitute goods (e.g., chicken) shifts out, while the demand curve for complementary goods (e.g., tomato sauce) shifts in *(i.e.,* there is more demand for substitute goods as they become more attractive in terms of value for money, while demand for complementary goods contracts in response to the contraction of quantity demanded of the underlying good).

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2) **Size of the consumer's income:** The demand for a commodity is also influenced by the size of the income of the consumer. In cases where the increase in income of the consumer leads to an increase in the quantity demanded of the commodity is referred to a case of a 'normal commodity'. Sometimes an increase in the size of the income leads to a fall in the quantity demanded of the commodity. Such a situation is possible when the commodity in question is what is referred to as an ''inferior commodity'.

Brain Teaser

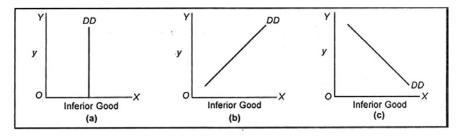Q.1. Which of the following curves shows the income demand for inferior goods?

(a) (b) (c)

Fig. 3.2

Ans. Fig. 3.2 (c)

3. **Prices of other commodity:** A consumer's demand for a commodity is equally influenced by the prices of commodities other than the commodity in question.

> **Complementary goods** are those goods whose utility depends upon the availability of both the goods together. The demand for complementary goods bears an inverse relationship with the price of the related goods.
>
> **Substitute goods** are those goods which can be used with equal ease in place of one another. Demand for a good will bear a direct relationship to the price of its substitute good.

In some cases, the demand for the commodity in question will increase as the price of the other commodities increases while in other cases the demand for the commodity will decrease as the price of the other commodity increases. The first case is a situation of what is called a 'substitute' and the latter case is a situation of what is called a complement'. Tea and coffee are examples of substitutes while car and petrol or ink pen and ink are examples of complements.

Q.2.   If the air travel fare between Bengaluru and Delhi falls significantly, how will it affect (i) demand for rail travel and (ii) demand for air travel. Show graphically.

(a) (b)

Figure 3.3

Ans. (*i*)Demand for rail travel will decrease (as shown in Figure 3.3 (a)).

(*ii*) Demand for air travel will expand (as shown in Figure 3.3 (b)).

Q.3 Draw a price demand curve for salt.

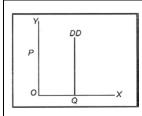**Ans**. It would be perfectly inelastic, horizontal curve parallel to Y-axis.

Figure **3.4**

Pick of The Day

Never give up. No matter how hard the situation is, always believe that something beautiful is going to happen.

—*Lewis Hamilton (F1 driver)*

4. **Tastes of consumer:** The demand for a commodity is also influenced by the tastes of the consumer. If a consumer has developed a taste for a particular commodity, he/she will demand more of that commodity. Similarly, if a consumer has changed his taste against a particular commodity, less of it will be demanded at a particular price.

The change of tastes can be illustrated with the help of an example. The consumers have developed taste for colored T.V so that even if price of it rises consumers will still buy more of it. Taste for colored T.V has developed at the cost of black and white T.V. Thus, even if the price of black and white T.V. falls, the consumers will still buy less of it.

3.4.2 Determinants of Demand for a Market

Given the price of a commodity we can find out the demand or quantity demanded on the part of a consumer. If the demand or quantity demanded of all the possible consumers purchasing this commodity in a market are added together, we get the market demand of the commodity in question. The factors determining the demand of a commodity for a market are the same as those which determine the demand of the commodity on the part of a consumer. Besides that two additional factors are also to be included. These two factors are:

1) **Size of the population:** All other factors remaining unchanged, the greater is the size of the population, more are the chances of a commodity being demanded more. Size of the population itself is dependent on so many other factors. The growth of population in a country is largely determined by birth rate and death rate. Death rates historically have shown a tendency to fall earlier than birth rates. But both these factors account for the growth rate in population. Marginally, population is also affected by emigration and immigration. This may of some importance in a small country, but in a country with a large population like India (1380 million in 2020), the effect of emigration/immigration is not significant.

2) **Income distribution:** It is a little difficult concept to explain. In simple terms, it implies how the National Income (the factor income of the nationals of an economy over a year) is distributed among lower and higher income groups of people. Let us explain it with the help of an illustration. In situation A, suppose the poorest 10 per cent of the total population accounts for 2 per cent of the national income of an economy and the richest 10 per cent of the total population enjoy 6 per cent of the national income of an economy. This situation is known as highly unequal distribution of income as compared to another situation B where the poorest 10 per cent of the total population account for 9 percent of national income and the richest 10 per cent of the total population enjoy 30 per cent of national income.

In situation A, richest 10 per cent of the population can have a command over 60 per cent of total demand and thus the basket of commodities demanded will be those consumed by the rich, on other hand in situation B, richest 10

per cent of the population can have a command over just 30 percent of total demand. The situation A represents higher inequalities of income than the situation B. More unequal is distribution of income, more will be the demand of the commodities which are purchased by the rich. Such commodities may be cars, refrigerators, air conditioners etc. Less unequal is distribution of income more will be the demand of the commodities which is purchased by relatively poorer people. Such commodities may be food items like wheat and rice, fans, bicycles etc.

The factors determining market demand of a commodity can be summarized as:

i.   Price of the commodity

ii. Prices of other commodities

iii. Income of the consumers

iv. Tastes of the consumers

v.   Size of population

vi. Income distribution.

In functional form, the market demand function can be represented by:

$M_{Dx} = f(P_x, P_L, P_M, P_N....P_z, Y, T, N, Y_D)$

where symbols $P_x, P_L, P_M, P_N....P_z, Y, T, N$ are already explained earlier and M_{Dx} is market demand of commodity X, N is the size of the population and Y_D income distribution.

Check Your Progress A

1. Distinguish between want and demand of a commodity.

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    ……………………………………………………………………………………
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2. What are the determinants of demand of a commodity on part of a consumer?

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3. Explain the factors influencing the market demand of a commodity.

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4. Into which of the six categories $(P_X, P_L, P_M, P_N.... P_Z, Y, T, N, Y_D)$ do the following factors fall?

    i.   Dislike of paper bags for shopping purposes.....

    ii.   Price of deep freezing facilities falling, making the demand for fresh vegetables fall....................

    iii. The price of ball pens falling leading to an increase in the demand for ball pens …………………………

    iv.   Increase in tax on the income of the consumer……………….

    v.   The rich becoming richer and the poor becoming poorer……..

    vi.   The birth rate remaining constant and the death rate falling.......

    5. State whether the following statements are **True** or **False.**

    i)   The want and the demand of a commodity are the same.

    ii)   As the price of a commodity falls, its demand rises.

    iii) As price of ink pens rise, the demand for ink rises.

    iv)   As more income tax is imposed on a person, his capacity to buy more commodities rises.

    v)   As income distribution becomes more unequal, the demand for food rises.

    vi)   As size of population rises, the demand for commodities falls.

3.5   THE LAW OF DEMAND

Among the factors influencing demand of a commodity explained in 3.4, the most important factor is price of the commodity in question.

Alfred Marshall

Generally speaking, in almost all commodities, the demand of a commodity increases as the price of the commodity falls and vice versa; price of other

commodities, income of the consumer and tastes of the consumer remaining unchanged. The reason of this tendency will be explained in 3.5.3. This particular relation between the price of a commodity and amount demanded is called the 'Law of Demand'. In short, the law of demand can thus be stated as follows: Other things remaining equal, there is an inverse relationship between the price of a commodity and its quantity demanded:

3.5.1 The Demand Schedule

Let us use imaginary figures to show the application of the law of demand. Table 3.1 given below, showing the application of the law of demand, is called the 'Demand Schedule'.

Table 3.1 The Demand Schedule of a Consumer for Apples

Price of an Apple in Rs.	Quantity Demanded of Apples in Units per week
100	15
200	12
300	8
400	3
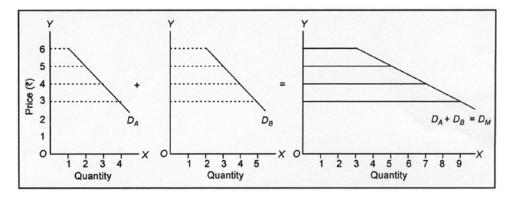
There are four combinations of price and quantity demanded shown in the table 3.1. If we study this table we can easily infer that as price of an apple is rising quantity demanded of apples on the part of the consumer is falling. Thus, the figures chosen are such that the law of demand is applicable.

The demand schedules for ice cream for two individual households in a given

period is given below. Suppose, there are only two households that demand ice cream. Draw market demand schedule and curve for ice creams.

Price (Rs.)	Quantity Demanded by	
	Household A	Household B
3	4	5
4	3	4
5	2	3
6	1	2

Ans. We will estimate the market demand schedule as follows:

Price (Rs.)	Quantity Demanded by		Market Demand
	Household A	Household B	
3	4 +	5	= 9
4	3 +	4	= 7
5	2 +	3	= 5
6	1 +	2	= 3

Market demand curve is a *horizontal summation* of individual demand curves, as illustrated below

3.5.2 The Demand Curve

The information given above can also be presented with the help of a graph as shown in Figure 3.5.

On the Y-axis, price of apples in rupees in measured on the X-axis the quantity demanded of apples per week on the part of a consumer measures. The
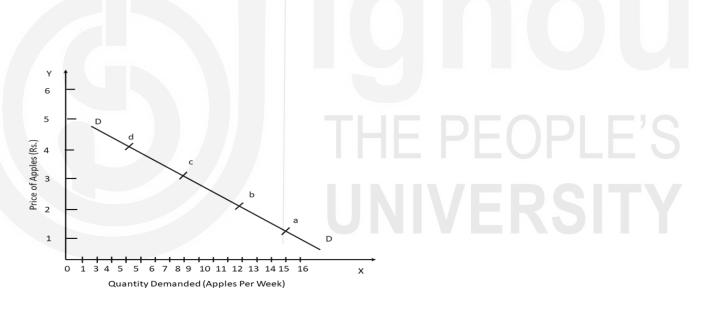

Figure 3.5 : Straight Time Demand Curve

first combination of Table 3.1 is shown by point a where at Rs. 1 price per apple15 units of apples are demanded. Similarly points b, c, d represent combinations of Rs. 2 price- 12 quantity demanded, Rs. 3 price - 8 quantity demanded and Rs. 4price-2 quantity demanded respectively. The joining together of points a, b, c, and d give us what is called the demand curve. Thus DD is the demand curve.

The most important feature of a demand curve is that it slopes downward from left to right. In Figure 3.5 the demand curve has been shown as a straight line. But the demand curve need not always be a straight line. It can also be in the form of curve as shown in Figure 3.6.

Whether a demand curve is a straight line or a curve depends an how much quantity demanded rises with the fall of its price or how much quantity demanded falls with the rise in the price of the commodity. Whether we take Figure 3.5 or 3.6, in both the cases the law of demand is applicable.
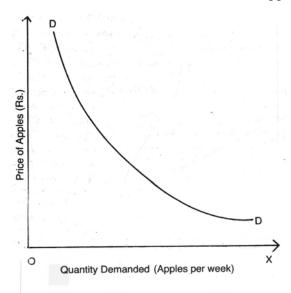

Figure 3.6:

3.5.3 The Explanation of the Law of Demand

Law of demand states that there is inverse relationship between the price of a commodity and its quantity demanded. Why is it so? The answer can be given with the help of three concepts.

Price Effect is the sum total of the substitution effect and income effect, i.e.

PE = SE + IE

Where   PE = Price Effect.

SE = Substitution Effect

IE = Income Effect

1. **Substitution Effect**

    Substitution effect results from a change in the relative price of a commodity. Suppose a Pepsi Can and a Coke Can both are priced at 20 each. If the price of Coke is raised to 25, and the price of Pepsi is not changed, Pepsi will become relatively cheaper to Coke, i.e. although the absolute price of Pepsi has not changed, the relative price of Pepsi has gone down. The change, in the relative price of commodity causes substitution effect.

    When the price of a commodity say mango falls, prices of other fruits remaining constant, the consumer buys more mangoes by buying less of other fruits. This happens because mango starts looking relatively cheaper to him. This can also be stated by saying that the consumer substitutes mango for other fruits when the price of mango drops. This effect is called 'substitution effect'. This is the main reason for the

consumer to buy more of mango, when the price of mango falls, provided prices of other fruits remain unchanged.

2. **Income Effect**

Given the money income of the consumer, as price of mango falls the purchasing power of that given money income rises, or to put it differently by stating that as price of mango falls, given money income of the consumer, his real income rises. Thus, he can buy more of the mangoes with the same money income and consequently, there is tendency for the demand for mangoes to rise.

This rise in real income with the fall in price of the commodity is called the '**income effect**'. The rise in money income has the same impact on the quantity demanded of a commodity as the rise in real income. Such a commodity whose quantity demanded rises with the rise in money or real income is called a 'normal commodity'. The income effect in such a case is called **positive income effect**. It is positive because there is a direct relationship between the income and the quantity demanded. In a case when rise in money or real income leads to a fall in the quantity demanded of a commodity, we have a case of **negative income effect**. The negative income effect operates in the case of a commodity which is called an '**inferior commodity**'. An unbranded cardigan is an inferior commodity in comparison to a branded cardigan.

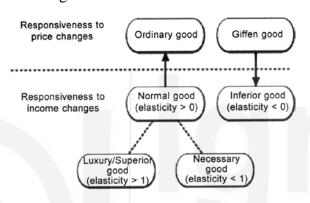| FOR MORE CLARITY!	FOR MORE CLARITY!
The income effect in economics can be defined as the change in consumption resulting from a change in real income.	The substitution effect is the effect observed with changes in relative price of goods. This effect basically affects the movement along the curve.

3. **Price Effect**

Substitution effect and income effect are combined together to get what is called '**price effect**' which relates the quantity demanded of a commodity to the price of the commodity. It is important to realize that substitution effect and income effect do not operate in a sequence, when the price of a commodity changes. In fact, **both substitution and income effects operate simultaneously** with the change in the price of the commodity. Given '**substitution effect**', and '**income effect**' when taken together give 'price effect.' We can identify three cases.

1. Substitution effect always operates in a manner such that as price falls, quantity demanded of this commodity increases. If along with substitution effect, we take income effect and if that happens to be positive (a case of normal commodity) the law of demand will necessarily apply.

2. Given substitution effect, if income effect is negative (a case of an inferior commodity) the law of demand can still apply provided the

substitution effect outweighs or is more powerful than the negative income effect, and

3. Given substitution effect, if income effect is negative (a case of an inferior commodity) the law of demand will not apply provided negative income effect outweighs or is more powerful than the substitution effect.

GIFFEN GOOD

A case where negative income effect outweighs substitution effect is possible when we have 'Giffen good' named after the Robert Giffen who first talked of such paradox. In case of a Giffen Good the fall in price of a commodity need not lead to an increase in the quantity demanded of the commodity. On the contrary, a fall in the price of a Giffen good may result in a fall in demand for this good.

> **FOR MORE CLARITY!**
>
> In economics and consumer theory, a **Giffen** good is one which people paradoxically consume more of it as the *price* rises, violating the law of demand. In normal situations, as the price of a good rises, the substitution effect causes consumers to purchase less of it and more of substitute goods. In the Giffen good situation the income effect dominates, leading people to buy more of the good, even as its price rises.

Robert Giffen

3.6 CHANGE IN DEMAND AND CHANGE IN QUANTITY DEMANDED

As explained earlier in this unit, the demand or quantity demanded of a commodity on the part of the consumer is determined by factors like price of the commodity, prices of commodities other than the commodity in question, income of the consumer and the taste of the consumer purchasing the commodity.

Whenever the demand of the commodity changes because of the change in the price of the commodity, it is called 'change in demand'. On the other hand, when

the demand of the commodity changes because of change in factors other than the · price of the commodity it is called 'change in quantity demanded'.

The change in quantity demanded of a commodity may take the form of expansion or contraction in demand. Expansion in demand takes place when with a fall in the price of a commodity, quantity demanded rises. Conversely, with a rise in the price of a commodity, its quantity demand falls.

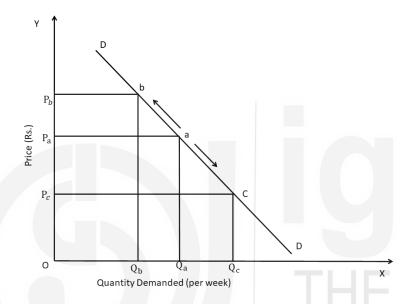Extension and contraction in demand is explained in Figure 3.7.

Figure 3.7 : Change in Demand

On X-axis quantity demanded of a commodity is measured and on Y-axis price of a commodity is measured in rupees. DD is the demand curve. At point 'a' on the demand curve we find that at price OP_a, OQ_a, of a commodity is demanded. As price falls to OP_c, demand becomes OQ_c. This movement from point a to point c on the demand curve DD is referred to as 'extension in demand'. It is also indicated by the arrow from a to c. Similarly when price of a commodity rises to OP_b, demand falls to OQ_b . Thus the movement from a to b on the demand curve DD is known as 'contraction in demand'.

Change in Demand

Change in demand takes place when the whole demand condition undergoes a change. This change occurs due to a change in any determinant of demand, except the price of a commodity. For example, due to an increase in the income of a household it may begin to consume more of milk (although there is no change in price of milk). Likewise, with the introduction of satellite TV, demand for cable TV has substantially come down. (although the price of Cable TV has not been changed).

Change in demand may take two forms:

(i) Increase in demand, and (ii) Decrease in demand.

Increase in demand takes place when;

(a) at a given price higher quantity is demanded, or

(b) at a higher price, the same quantity is demanded

Decrease in demand takes place when:

(a) at a given price lower quantity is demanded, or

(b) at a lower price, the same quantity is demanded

Graphically, increase in demand results in rightward shift of the whole demand curve. Likewise, decrease in supply results in leftward shift of the demand curve. This is shown in the Fig. 3.8
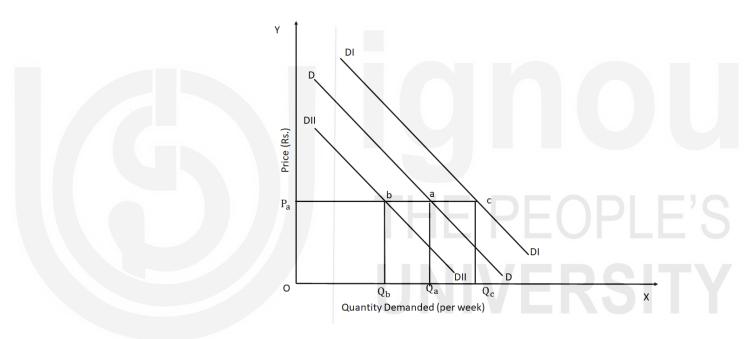

Figure 3.8: Change of Quality demanded

As usual, on X-axis quantity demanded of a commodity is measured and on Y-axis price of a commodity is measured in rupees. At price P_a, on the demand curve DD at point 'a', quantity demanded is OQ, and at the same price OP quantity demanded, rises to OQ_a at point c on the demand curve D'D' This rise in demand is called 'increase in quantity demanded'. Similarly, at price OP, the quantity demanded comes down to OQ_c. on point b of demand curve D"D". This change in quantity demanded form OQ_a to OQ_c is called 'decrease in quantity demanded'. Or the movement of the demand curve to the right of the initial demand curve is called 'increase in quantity demanded' and a movement of the demand curve to the left of the initial demand curve is called 'decrease in quantity demanded'. There can be a number of factors responsible for the shift of the demand curve. Some of the factors are given below:

1. Increase in quantity demanded or shift in the demand curve to the right can be because of increase in money income of the consumer. An increase in money income of the consumer enables him to demand more of a commodity at a given price. Similarly, in quantity or shift in the demand curve to the left can be because of decrease in money income of the consumer.

2. A rightward shift in the demand curve can also take place because of increase in price of a substitute or decrease in price of a complement. Similarly, a leftward shift in the demand curve can be because of decrease in price of a substitute or increase in price of a complement.

3. If the consumer has developed a taste for a commodity, he can start demanding more of that commodity even if the price remains unchanged. Thus, a rightward shift in the demand curve can be caused by the fact that the consumer has developed a taste for the commodity in question. Similarly, a leftward shift in the demand curve can be the result of the fact that the consumer has started disliking the commodity. It may be remembered that we have been considering movements of only the demand curve of an individual consumer. The market demand curve and its movements are not been discussed here.

3.7 APPLICATIONS OF THE LAW OF DEMAND

The application of the law of demand can be of great assistance in framing the Government policy relating to fixation of prices of commodities. Some of the important applications of the law of demand in government policy are given below:

1. **Fixation of price of a commodity:** As usual X and Y-axis measure quantity demanded of a commodity and price of a commodity respectively. At OP, price, quantity demanded of a commodity is OQ_1. Suppose the quantity of a commodity produced is OQ_1, represented by a straight line SQ_1, parallel to Y-axis showing that the quantity
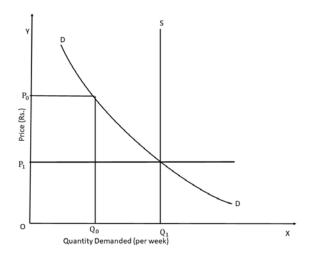

Figure 3.9 : Fixation of Price of a Commodity

produced does not undergo a change with the change in the price of the commodity. Now, if the government is interested to dispose off the whole of the quantity produced, then the only way it can be done is by reducing the price of the commodity from OP_0 to OP_1 (Figure 3.9). This the government can do because it knows that the law of demand is applicable for the commodity.

2. **Announcement of the subsidy or tax:** The subsidy is assistance in form of cash given by the government to the producer. Suppose that the capacity to produce in the economy is more but for some reason the quantity demanded is not sufficient, the government can announce a subsidy to the producer to create more demand for the commodity. Similarly, if the capacity to produce is less than the demand for the commodity, the government can impose a tax on the commodity to reduce the quantity demanded of the commodity.

3. **Law of demand and the consumer's surplus:** The consumer's surplus is the difference between the price, the consumer is prepared to pay rather than go without the commodity and the price which he actually pays. It is measured in Figure 3.10.
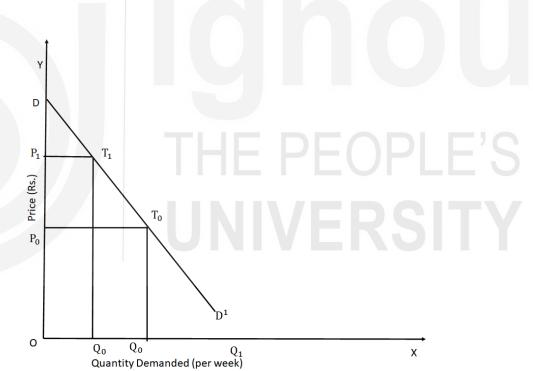

Figure 3.10 : Consumer Surplus

Given the demand curve DD', at the price of OP, the quantity demanded is OQ_0. and the consumer's surplus is $P_0T_0 D$. Suppose, the government finds that the consumers are enjoying a higher consumer's surplus. The government in that case can increase the price of the commodity say to OP_1. This reduces the consumer's surplus to P_1,T_1,D. The price can be increased by imposing a tax. Whether or not to impose a tax will depend on what is the extent of the loss of consumer's surplus in relation to the tax imposed. For example, in the Figure 3.10, we find that the loss to consumer's surplus is $P_1 P_0T_0T_1$. This loss in consumer's surplus has to be compared to the tax revenue collected by

the government. The tax will be imposed only when the tax collected is more than the loss of consumer's surplus. Similarly, if the government decides to subsidize a commodity, it will be done only when the gain of consumer's surplus is more than the amount of subsidy given by the government.

Check Your Progress B

1. Distinguish between movements along a demand curve and movements of the demand curve.

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2. What is the difference between expansion in demand and increase in demand?

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3. State whether the following statements are **True** or **False**.

    i)   The law of demand states that there is an inverse relationship between the price of a commodity and its quantity demanded.

    ii) The demand curve is always straight line sloping downwards from left to right.

    iii) If substitution effect outweighs positive income effect, the law of demand does not operate.

    iv) Substitution effect + Price effect = Income effect.

    v)   If the price of a substitute falls, the quantity demanded of a commodity falls.

    vi) Change in taste leads to a movement along the demand curve.

    vii) If increase in consumer's surplus is less than the amount of subsidy given by the government, subsidy needs to be given to an industry.

    viii)If quantity produced is more than the quantity demanded at a particular price, the government should reduce the price of the commodity.

3.8   LET US SUM UP

The demand for a commodity is a flow which is measured over period and is backed by purchasing power and always expressed with reference to a price.

There are many factors which influence the demand of a commodity on the part of a consumer. These factors are price of the commodity in question, income of the consumer, prices of commodities other than the commodity in question and the tastes of the consumer. The market demand is influenced by two additional factors namely, size of population and distribution of income.

The law of demand states that there is an inverse relationship between the price of the commodity and its amount demanded, other things remaining unchanged. The law of demand can be explained with the help of a demand schedule where quantity demanded of a commodity is stated at different levels of prices. The law of demand can also be explained with the help of a demand curve which slopes downwards from left to right, such that on X-axis quantity demanded of the commodity and on the Y-axis price of the commodity are measured.

The operation of the law of demand is explained by making a distinction between substitution effect and income effect and the sum of these two effects is referred to as price effect. Income effect is positive for a 'Normal commodity' where there is a direct relationship between income of the consumer and amount demanded of a commodity. Income effect is negative for an 'Normal commodity' where there is an inverse relationship between income of the consumer and the amount demanded of a commodity. If negative income effect operates and it outweighs substitution effect, then it is a case of exception to the law of demand. Both substitution and income effects operate simultaneously. There is a distinction between the movement along a demand curve and the movement of the curve. If we move along a demand curve to the right, it is a case of extension in demand and if the movement is to the left of a given point on the demand curve we get contraction in demand. If the demand curve moves to the right it implies that at a given price more is demanded. It is called Increase in quantity demanded. Similarly, a movement of the demand curve to the left implies that there is Decrease in quantity demanded. The increase or decrease in quantity demanded takes place due to change in the price of commodities other than the commodity in question or because of change in tastes. The operation of the law of demand can help the government in fixing up the price of the commodity. If quantity produced is more than the demand of a commodity at a particular price, it is an indication to the government to lower the price of the commodity. It also helps the government to decide whether to subsidize or tax a commodity.

3.9 KEY WORDS

Change in Demand: Movement along a demand curve in relation to a particular point on the demand curve.

Change in Quantity Demanded: Movement of the demand curve itself caused by factors other than the price of the commodity in question.

Consumer's Surplus: The difference between the price the consumer is prepared to pay rather than go without the commodity and the price which he actually pays to buy the commodity.

Demand Curve: A line or a curve which shows different combinations of prices of a commodity and its amount demanded. It normally slopes downwards from left to right.

Demand Schedule: A table showing the amount demanded of a commodity at different levels of prices of a commodity.

Demand: The want of the commodity backed by the purchasing power.

Flow Variable: A variable which can be measured only over a period of time.

Giffen Good: A commodity in which there is a direct relationship between the price of a commodity and its amount demanded.

Inferior Commodity (Good): A commodity in which there is an inverse relationship between the income of the consumer and amount demanded of a commodity.

Income Effect: It shows the effect of a change in income of the consumer on the quantity demanded of a commodity.

Income Distribution: The distribution of national income percentage wise among different income groups in the society.

Law of Demand: It states that there is an inverse relationship between the price of a commodity and its amount demanded, other things remaining unchanged.

Normal Commodity: A commodity in which there is a direct relationship between the income of the consumer and amount demanded of a commodity.

Subsidy: The cash help given by the government to the producer so that he charges relatively a less price from the consumer.

Substitution Effect: It shows how with a change in the price of a commodity, prices of other commodities remaining unchanged, a consumer substitutes one commodity for the other.

Want: The wish on the part of a consumer to possess the commodity. It need not be backed by the purchasing power to buy the commodity.

3.10 ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

4   i) Tastes, ii) Price of other commodities, iii) Price of ball pens,
    iv) Income of the consumer, v) Distribution of income,
    vi) Population.

5   i) False, ii) True, iii) False, iv) False, v) False vi) False.

Check your progress B

3. i) True ii) False iii) False iv) False v) True vi) False vii) False

    viii) True

3.11 TERMINAL QUESTIONS

1. Explain the main determinants of demand of a commodity in the market.

2. Explain the law of demand with the help of a demand schedule and a demand curve.

3. Distinguish between substitution and income effects of a price rise.

4. Explain the exceptions to the law of demand using the distinction between substitution and income effects.

5. Distinguish between an Inferior good (commodity) and a Giffen good.

6. What uses can be made by the government of the law of demand in deciding about the price policy and tax cum subsidy policy.

> **Note: These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University. These are for your practice only.**

UNIT 4   ELASTICITY OF DEMAND

Structure

4.0   OBJECTIVES

After studying this unit, you should be able to:

* explain the concept of elasticity of demand

* identify price elasticity of demand, income elasticity of demand and price

* cross-elasticity of demand

* describe various methods to measure price elasticity of demand

* identify the case of unitary price elastic

* demand curve list the factors determining price elasticity

* explain the importance of the price elasticity of demand.

4.1   INTRODUCTION

In the previous unit, we have studied the demand function and also the law of demand. The demand function and the law of demand tell us about the direction of change if the value of any independent variable changes. But these do not tell us anything about the magnitude of the change. If, for example, the price of a commodity falls, we know its quantity demanded will increase. By how much, we do not know. To measure the change we make use of another concept. This is called Elasticity of Demand. In this unit you will study the extent to which the price of a commodity, income of the consumer and prices of other commodities exercise influence on the quantity demanded of a commodity. This you will study with the help of price

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elasticity of demand, income elasticity of demand and the cross-elasticity of demand. You will also study the factors on which the price elasticity of demand of a commodity depends along with the importance of the concept of price elasticity of demand in various government policies.

4.2   CONCEPT OF ELASTICITY OF DEMAND

The elasticity of demand is the responsiveness of a dependent variable (demand) to a given change in independent variables (price of a commodity, income of the consumer or price of a commodity other than the commodity in question). Elasticity is always worked in terms of a percentage or proportionate change in the dependent variable to a given percentage or proportionate change in the independent variable.

It is important to remember that though the demand of a commodity is dependent on various factors, yet the law of demand states that the demand of a commodity is inversely related to its price. This is possible because the factors other than the price of the commodity are assumed to remain unchanged. In technical terms, such a situation is referred to as partial equilibrium approach. It is called partial because all the factors exercising influence on demand of a commodity are not allowed to change at the same time. It is also possible to assume the price of the commodity and prices of other commodities remain unchanged and we can work out a relationship between the demand of the commodity and the income of the consumer' who demands the commodity. Similarly, we can assume the price of the commodity and income of the consumer as unchanged and a relationship can be worked out between the demand of the commodity and the price of the commodity other than the commodity in question.

The concept of elasticity, on the other hand, tries to quantify the relationship between the demand of the commodity and the price of the commodity or income of the consumer or price of the commodity other than the commodity in question, but at a time only one of the three factors mentioned above are allowed to change, keeping other factors as unchanged. Accordingly, there are three concepts of elasticity we are going to consider in this unit. They are (i) price elasticity of demand, (ii) Income elasticity of demand, and (iii) Cross elasticity of demand.

4.2.1   Price Elasticity of Demand

Price elasticity of demand measures the relative change in quantity demanded of a commodity resulting from a given (percentage or proportional) change in its price. This can also be stated by saying that the price elasticity of demand is the relative responsiveness of quantity demanded of a commodity to change in the price of the commodity. This can be expressed in a different way by stating that the price elasticity of demand is the proportional or percentage change in quantity demanded of a commodity divided by the proportional or percentage change in the price of the commodity.

Let price elasticity of demand be represented by P_{ed} where P stands for price and $_{ed}$ for elasticity of demand. Then,

$$P_{ed} = \frac{\text{Propotional Change in quantity demanded of the commodity}}{\text{Proportional change in price of the commodity}}$$

Proportional change of a variable need to be explained. This can be explained with the help of an example.

Suppose, the quantity demanded is 20 units and it gets increased to 30 units, then the proportional change in quantity demanded is the new quantity demanded (30 units) minus the old quantity demanded (20 units) and whatever figure of quantity demanded is left (30 units – 20 units) if divided

by the old figure of quantity demanded (20 units), this $\frac{30-20}{20}$ or $\frac{10}{20}$ is the

proportional change in quantity demanded.

Similarly, proportional change in the price of a commodity can also be explained with the help of an example.

Suppose the price of a commodity is Rs. 3 per unit and it falls to Rs. 2, then the proportional change in price is the new price (Rs. 2) minus the old price (Rs. 3) and whatever figure is left (Rs. 2 - Rs. 3) if divided by the original

price (Rs. 3) will give the proportional change price $\frac{(\text{Rs.}2-\text{Rs.}3)}{\text{Rs.}3}$ or $\frac{\text{Rs.}-1}{\text{Rs.}3}$

Symbols can be used to express proportional changes. Let the difference between the new quantity demanded and the old quantity demanded be represented by A D and the original demand be represented by D, then proportional change in quantity demanded of

commodity is $\frac{\Delta D}{D}$. Similarly,

> **FOR MORE CLARITY!**
>
> Price elasticity of demand (PED or E_d) is a measure used in economics to show the responsiveness, or elasticity, of the quantity demanded of a good or service to a change in its price. More precisely, it gives the percentage change in quantity demanded in response to a one per cent change in price (holding constant all the other determinants of demand, such as income). It was devised by Alfred Marshall.

let us represent the difference between the new price and the old price by AP and the original price be represented by P, then the proportional change in

price is $\frac{\Delta P}{D}$

If proportional change in quantity demanded of a commodity $\left(\frac{\Delta D}{D}\right)$ is divided by proportional change in price $\left(\frac{\Delta P}{P}\right)$ then price elasticity of demand P_{ed} is:

$$Ped = \frac{\frac{\Delta D}{D}}{\frac{\Delta P}{P}}$$

The above expression can also be represented as :

$$P_{ed} = \frac{\Delta D}{D} \times \frac{P}{\Delta P}$$

Or $P_{ed} = \frac{\Delta D}{\Delta P} \times \frac{P}{D}$

Since, the price of a commodity and its quantity demanded are inversely related minus sign will appear either in the denominator or in the numerator. Therefore, in the final form price elasticity of demand (P_{ed}) can be represented as:

$$P_{ed} = \frac{\Delta D}{\Delta P} \times \frac{P}{D}$$

The figure in the examples given above can be put in the formula to find out the price elasticity of demand. Thus, price elasticity of demand (Ped) is

$$P_{ed} = \frac{\Delta D}{\Delta P} \times \frac{P}{D}$$

$$= \frac{10}{-1} \times \frac{2}{-20} = -1$$

In this case, price elasticity of demand is negative which indicates an inverse relationship between price and quantity demanded.

Without going into details, it is important to state that the method to find out price elasticity of demand given above is used or valid only for very small changes in price and quantity demanded of a commodity. The method given above is called "point" price elasticity of demand.

Interpretation of price elasticity coefficient

The value of P_{ed} may vary from Zero ($P_{ed} = 0$) to infinity ($P_{ed} = \infty$). For sake of convenience we can classify these in following five groups.

1. *P$_{ed}$ equal to infinity (P$_{ed}$ = ∞)*. This type of elasticity of demand obtains when a small change in price results in infinite changes in quantity demanded. Alternatively, it can be represented as a situation in which it is not possible to determine the quantity that would be demanded at a given price. This type of demand is also called perfectly elastic demand. Perfectly elastic demand can be represented graphically with the help of a horizontal straight line, as shown in Fig. 4.1

2. *P$_{ed}$ = 0*. This happens when the quantify demanded *does not change absolutely* with a change in the price of the commodity. This situation is called *perfectly inelastic* demand. Graphically it can be represented in the form of a vertical straight line demand curve as shown in Fig. 4.1. This would be seen that the quantity demanded of commodity remains unchanged at OQ, irrespective of the change in the price of the commodity.

3. *P$_{ed}$ equal to one (P$_{ed}$ = 1)*. This value is obtained when the percentage change in quantity demanded equals the percentage change in price. A 10 percent fall in price induces a 10 percent increase in quantity demanded. This type of demand is said to be equal to Unitary Elastic.

4. *P$_{ed}$ more than one (P$_{ed}$> 1)*. This type of elasticity of demand obtains when the percentage change in quantity demanded is more than the percentage change in the price of a commodity. For example, a 10 per cent reduction in the price of quality chocolate may result in a 30 percent increase in the quantity demanded of chocolates. In this case, $P_{ed} = \dfrac{30\%}{10\%} = 3$. This type of demand is called more than unit elastic demand or Relatively elastic

5. *P$_{ed}$ greater than zero but less than one – (P$_{ed}$> 0 < 1)*. This value is obtained when the percentage change in quantity demanded is less than the percentage change in price. For example, a 10 percent fall in price may induce 8 percent rise in quantity demanded. This type of demand is known as less than unit elastic or Relatively inelastic
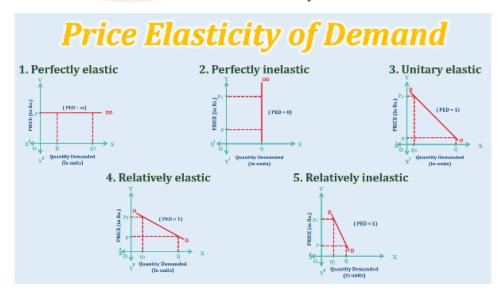

Figure 4.1: Price elasticity of Demand

Application of Interpretation

The value of P_{ed} is of significant use, especially in business decision-making. For example, What does $P_{ed} = 1.2$, means?

The answer is: If the price of a commodity it raised by 1 per cent, quantity demanded of this commodity will fall by 1.2 per cent. Similarly, if the price of a commodity is reduced by 10 percent, the quantity demanded of this commodity may increase by 12 percent.

BRAIN TEASERS

1. **Why do we ignore the minus sign in the calculation of price elasticity coefficient?**

   Ans. Strictly speaking, minus sign should not be ignored while estimating price elasticity coefficient. But all the same, it is yet ignored for the following two reasons:

   i) Price and demand have an inverse relationship, therefore, elasticity coefficient will always have a minus sign.

   ii) For the convenience of understanding. Strictly speaking, (–)1 is greater than (–)3. But elasticity coefficient of (–)1 makes demand more elastic than the elasticity coefficient of (–3), and hence (–) sign is ignored.

2. **Are slope of a demand curve and elasticity of a demand curve the same thing?**

   Ans. No. Elasticity of demand is not the same thing as the slope of a demand curve. Often the two are confused. Slope of a demand curve is the absolute change in price and quantity demanded and is measured as AP/AQ. Slope of a curve will be the same along its length. Elasticity of demand is a relative change. Elasticity will differ on different points of a curve; except when the curve is a vertical straight line ($E_P = 0$), and when it is a horizontal straight line $(E_P = \infty)$.

3. **A consumer spends Rs. 40 on a good at a price of Rs. 1 per unit and Rs. 60 at a price of Rs. 2 per unit. What is the price elasticity of demand?**

   Ans. By the percentage method, we estimate price elasticity as follows:

   $$E_P = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$$

   In the given problem,

Original	price	=	Rs.	1
New	price	=	Rs.	2
Original	quantity =		40	units

   New quantity = 30 units

   $$E_P = \frac{10}{1} \times \frac{1}{40} = 0.25$$

i.e., demand is less than unit elastic, or inelastic.

4. **A decline in the price of good *Y* by Rs. 5 causes an increase of 20 units of its demand which goes up to 50 units. The new price is Rs. 15. Calculate the elasticity of demand.**

   Ans. Given,

   $\Delta P = $ 5

   $\Delta Q = $ 20

   $P = 15$ $+5 = 20$

   $Q = 50 - 20 = 30$

   $$E_P = \frac{20}{5} \times \frac{20}{30} = 2.6$$

   i.e., demand is more than unit elastic.

5. **The price elasticity is 2. The percentage change in price is equal to 5. Find the percentage change in quantity.**

   Ans. By percentage method,

   $$E_P = \frac{\text{Percentage Change in Quantity Demanded}}{\text{Percentage Change in Price}}$$

   $\therefore$ $2 = \dfrac{X}{5}$

   or $X = 2 \times 5 = 10$

   i.e., a 5% change in price will cause a 10% change in quantity demanded.

4.2.2 Income Elasticity of Demand

Income elasticity of demand is the relative responsiveness of quantity demanded of a commodity to changes in income of the consumer demanding the commodity. It is the proportional or percentage change in quantity demanded of a commodity divided by the proportional change in income of the consumers demanding the commodity. Let us use symbols to represent income elasticity of demand (Y_{ed}) where Y stands for income and $_{ed}$ for elasticity of demand. Thus,

Y_{ed} is :

$$\text{Yed} = \frac{\text{Proportional Change in quantity demanded}}{\text{Proportional Change in income}}$$

$$= \frac{\frac{\Delta D}{D}}{\frac{\Delta y}{y}}$$

$$= \frac{\Delta D}{D} \times \frac{Y}{\Delta Y}$$

$$= \frac{\Delta D}{\Delta Y} \times \frac{Y}{D}$$

Where ΔY the change in income of the consumer, Y is is the original income,

ΔD is the change in quantity demanded of a commodity, D is the original demand.

Income elasticity of demand can be illustrated with the help of a numerical example. Study Illustration 1 for the calculation of income elasticity of demand.

Illustration 1

Income (in Rs.)	Quantity Demanded (in Units)
500	20
510	21

The change in income is 510-500 = 10, the change in quantity demanded is 21-20=1, original income is 500 and the original quantity demanded is 20. Thus

income elasticity of demand (Y_{ed}) is:

$$Y_{ed} = \frac{\Delta D}{\Delta Y} \times \frac{Y}{D}$$

$$= \frac{1}{10} \times \frac{500}{21} = +2.5$$

It is worth noting that no minus sign is attached to the co-efficient. It is so because we have assumed that there is a direct relationship between the quantity demanded and the income of the consumer demanding the commodity.

The income elasticity coefficient is +2.5. The plus sign shows that the commodity in question is a normal good. If the income of the consumer increases he will demand more of the commodity. In the given situation, a 10 percent increase in income will result in 25 per cent increases in quantity demanded.

Sometimes, the relationship between the quantity demanded of a commodity and the income of the consumer is inverse. Study Illustration 2 for this calculation.

Illustration 2

Income (in Rs.)	Quantity Demanded (in Units)
500	21
510	20

Income elasticity of demand (Y_{ed}) is:

$$Y_{ed} = \frac{\Delta D}{\Delta Y} \times \frac{Y}{D}$$

$$= \frac{-1}{10} \times \frac{500}{21} = -2.38$$

In this case, minus sign is attached to income elasticity of demand co-efficient because as income has increased from Rs. 500 to Rs. 510, the quantity demanded has fallen from 21 to 20 or there is an inverse relationship between the quantity demanded of a commodity and the income of the consumer demanding the commodity.

The case where there is a direct relationship between the quantity demanded of a commodity and the income of the consumer is termed as a case of 'Normal commodities'. The case where there is an inverse relationship between the quantity demanded of a commodity and the income of the consumer is termed, as a case of an inferior commodity.

If the income of the consumer increases by 10 per cent, quantity demanded will fall by 23.8%.

The plus and minus sign alongwith Y_{ed} assume great significance. Suppose:

i) $Y_{ed} = +1.8$, we can assume that the commodity in question is a normal good.

ii) $Y_{ed} = -1.8$, we can assume that the commodity in question is an inferior good.

iii) $Y_{ed} = 0$, we can assume that there is no relationship between the income of the consumer and the quantity demanded of the commodity (eg- Bare necessities of life).

4.2.3   Price Cross Elasity of Demand

The cross-elasticity of demand is the relative responsiveness of quantity demanded of a given commodity. It is the proportional or percentage change in the quantity demanded of a commodity say X divided by the proportional

or percentage change in the price of related commodity say Y. Let us use symbols to represent cross-elasticity of demand (C_{ed}) where C stands for cross and ed for elasticity of demand. Thus, C_{ed} is:

$$C_{ed} = \frac{\text{Proportional change in quantity demanded of commodity X}}{\text{Proportional Changee in price of commodity Y}}$$

$$= \frac{\frac{\Delta Dx}{Dx}}{\frac{\Delta P_Y}{P_Y}}$$

$$= \frac{\Delta Dx}{Dx} \times \frac{P_Y}{\Delta P_Y}$$

$$= \frac{\Delta Dx}{\Delta P_Y} \times \frac{P_Y}{Dx}$$

Where ΔDx, is the change in quantity demanded of commodity X, ΔP_y is the change in price of commodity Y, P_Y, is the original price of commodity Y and D_x is the original demand of commodity X. Cross-elasticity of demand can be illustrated with the help of an illustration.

Cross-elasticity of demand can be illustrated with the help of a numerical example. Study Illustration 3 for the calculation of Cross-elasticity of demand.

Illustration 3

Price of Tea in Rs.	Quantity Demanded of Coffee in Grams.
20	200
19	150

Suppose we have tea as one commodity whose price is Rs. 20 per 1000 grams which falls to Rs. 19, given the law of demand quantity demanded of tea may rise from 500 grams to 600 grams a week. Now coffee is a substitute of tea. If price of coffee remains unchanged, quantity demanded of coffee may fall from 200 grams to 150 grams. It has happened because quantity demanded of tea has increased from one packet to two packets. We can easily realize that the fall in the price of tea from Rs. 20 per packet to Rs. 19 per packet has reduced the quantity demanded of coffee from 200 grams to 150 grams.

The change is quantity demanded of coffee is 150 - 200 = - 50 the change in price of tea is 19 - 20 = -1, original quantity demanded of coffee is 200 grams and the original price of tea is Rs. 20. Thus price cross-elasticity of demand (C_{ed}) is:

$$C_{ed} = \frac{\Delta Dx}{\Delta P_Y} \times \frac{P_Y}{D_X}$$

where X is coffee and Y is tea. Thus

$$C_{ed} = \frac{-50}{-1} \times \frac{20}{200} = 5$$

It is worth noting that the co-efficient of price cross-elasticity of demand is positive or there is a positive relationship between the price of tea and quantity demanded of coffee. Whenever the co-efficient of price cross-elasticity of demand is positive, it is a case of what is called substitutes or in the above case, tea and coffee are substitute commodities.

Let us now consider the case of complements. Take an example. Suppose we have car as one commodity whose price is Rs. 80,000 per car and its price falls to 75,000 per car. The quantity demanded of cars for the community may rise from 1,000 to 1,100 cars, given the operation of the law of demand. Suppose, the price of petrol remains the same say Rs. 8 per litres. The quantity demanded of petrol my rise from 5,000 litres a month to 5,500 litres a month because the quantity demanded of cars has increased from 1000 to 1100 cars. We can see that the fall in the price of cars from Rs. 80,000 per car to Rs. 75,000 per car has increased the quantity demanded of petrol from 5,000 litres a month to 5,500 litres a month.

Price cross-elasticity of demand is illustrated with the help of a numerical example. This is shown in Illustration 4

Illustration 4

Price of Cars in Rs.	Quantity Demanded of Petrol in Litres
80,000	5,000 litres
75,000	5,500 litres

The change in quantity demanded of petrol is 5,500–5,000 = 500 litres. The change in price of cars is Rs. 75,000 - Rs. 80,000 = Rs.(-)5,000, the original quantity demanded of petrol is 5,000 litres, original price of cars is Rs. 80,000. Thus price cross-elasticity of demand (C_{ed}) is:

$$C_{ed} = \frac{\Delta Dx}{\Delta P_Y} \times \frac{P_Y}{D_X}$$

Where X is petrol and Y is Car.

$$C_{ed} = \frac{500}{-5000} \times \frac{80,000}{5,000}$$

= - 1.6

In this case the co-efficient of price cross-elasticity of demand, is negative or there is an inverse relationship between the price of cars and quantity demanded of petrol. Whenever the co-efficient of price cross-elasticity of demand is negative, it is a case of what is called complements, or in the above case, car and petrol are complementary commodities.

In short, if we are told:

i) Cross elasticity coefficient between two commodities is plus, we should know that the two commodities are substitutes (as Pepsi and Coke, or Samsung and Apple Tablets), and

ii) Cross elasticity coefficient between two commodities is negative, we should know that the two commodities are complementary goods (as motorbike and petrol, cell phone and sim card, heir die and shampoo, etc.)

Check Your Progress A

1) What is meant by price elasticity of demand?

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2) What is the difference between price elasticity of demand and income elasticity of demand?

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3) Distinguish between price elasticity of demand and cross-elasticity of demand.

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4) When is the co-efficient of income elasticity of demand and cross elasticity of demand negative?

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5) Under what situation the co-efficient of price elasticity of demand positive?

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6) State whether the following statements are **True** or **False.**

   i)   The income elasticity of demand is always positive.

   ii)   The co-efficient of cross-elasticity of demand is always negative.

   iii) When price elasticity of demand is determined income of the consumer is assumed to be changing.

   iv)   In the case of substitute commodities, the co-efficient of cross elasticity of demand is negative.

   v)   In the case of complementary commodities, the co-efficient of price cross elasticity of demand is positive.

   vi)   In the case of 'inferior commodities', the co-efficient of price elasticity of demand is positive.

   vii) In the case of 'normal commodities' the co-efficient of price elasticity of demand is positive.

   viii) When income elasticity of demand is found out, price of the commodities is also allowed to change.

4.3   MEASUREMENT OF PRICE ELASTICITY OF DEMAND

There are a number of methods to measure price elasticity of demand. Some of the important methods are as follows:

1) **Point Method:** The main point to remember about this method is that it is employed only when the changes in price and quantity demanded are very small.

2) **Outlay Method:** The outlay method to measure price elasticity of demand is used whenever the changes in price and demand are not small. Another point to remember about the outlay method is that it cannot help us to find out the co-efficient of price elasticity of demand. It only helps us to distinguish three situations:

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i) whether the price elasticity of demand is one or unity,

ii) whether the price elasticity of demand is more than one or more than unity and

iii) whether the price elasticity of demand is less than one or less than unity. This method can be explained with the help of numerical example. Study Illustration 5, 6 and 7 for this purpose.

Illustration 5

Price (In Rs.)	Quantity (In Units)	Demanded of a Commodity Outlay (In Rs.)
5	20	$5 \times 20 = 100$
4	25	$4 \times 25 = 100$

Illustration 6

Price (In Rs.)	Quantity (In Units)	Demanded of a Commodity Outlay (In Rs.)
5	20	$5 \times 20 = 100$
4	22	$4 \times 22 = 88$

Illustration 7

Price (In Rs.)	Quantity (In Units)	Demanded of a Commodity Outlay (In Rs.)
5	20	$5 \times 20 = 100$
4	30	$4 \times 25 = 120$

In the above illustrations, we can see that as price of a commodity falls, the quantity demanded of the commodity rises.

In illustration 5 with the fall in price of the commodity from Rs. 5 to Rs. 4 the total money spent on the commodity or outlay remains Rs. 100. It is a situation of what is called unity price elasticity of demand.

In illustration 6 with the fall in price of the commodity from Rs. 5 to Rs. 4, the total money spent on the commodity or outlay falls from Rs. 100 to Rs. 88. It is a situation of less than unity price elasticity of demand.
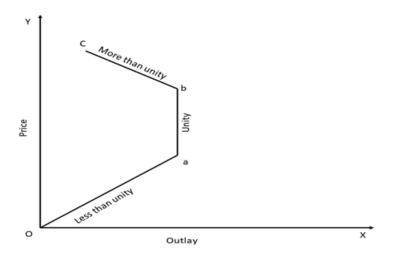
Figure 4.2: Elasticity of Demand

Finally, illustration 7 with the fall in price of the commodity from Rs. 5 to Rs. 4, the total money spent on the commodity or outlay rises from Rs. 100 to Rs. 120. It is a case in which price elasticity of demand is more than unity. This method is also explained with the help of Figure 4.2.

On the X-axis outlay is measured and on the Y-axis the price of the commodity is measured. From *0* to *a,* we have case of less than unity because there is a direct relationship between the price of the commodity and outlay. Between *a* and *b* the price elasticity of demand is unity because the outlay remains the same with the change in the price of commodity. Finally, between *b* and *c*, the price elasticity of demand is more than unity because there is an inverse relationship between price of the commodity and the outlay. Thus, when the price of the commodity rises and outlay also rises, it is also a case in which elasticity of demand is less than unity. Similarly, when the price rises and the outlay remains the same, it is also a case when price elasticity of demand is equal to unity. Finally, as the price of the commodity rises and the outlay falls, it is also a case when price elasticity of demand is more than unity.

3) **Geometrical Method:** According to this method, elasticity of demand is different at different points on a given demand curve, and is measured as follows on any point of a straight line curve.

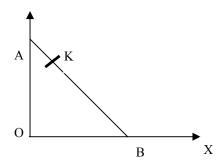   In Figure 4.3 (a), P_{ed} at point K = Kb/AK

Figure 4.3 (a): Elasticity of Demand

And since KB > KA, the result will be more than 1. We will say P_{ed} at Point K is more than unit elastic. We can use the same method to estimate price elasticity at different points, as shown in Figure 4.3 (a).
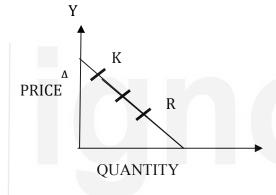

Figure 4.3(b)

It would be seen from Figure 4.3(b), that

1. at point B, P_{ed} = zero/AB = zero i.e. perfectly inelastic demand

2. at point R, P_{ed} = BR/AB = more than zero, but less than one, i.e. P_{ed} is less than unit elastic. P_{ed} will be >1 on the entire length of the curve from the point B till it reaches the point T.

3. at point T, P_{ed} = BT/AT = 1, i.e., demand is equal to unity at the middle point of the demand curve.

4. At point K, P_{ed} = BK/AK > 1, i.e. demand is more than unity.

5. At point A, P_{ed} = BA/Zero, i.e. P_{ed} is infinity.

Point method in a Curvi-linear demand curve

The method remains the same when we want to measure price elasticity on a curvi-linear curve. This is illustrated in Fig. 4.4
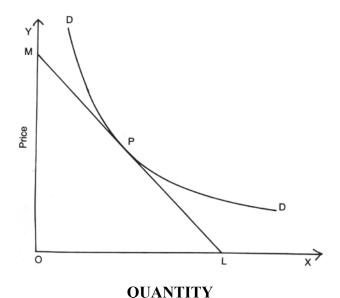
QUANTITY
Figure 4.4: Point Method to find out Elasticity

In Figure 4.4, quantity demanded of the commodity is measured on X-axis and on the Y-axis price of the commodity is measured. DD is the demand curve. Suppose we are interested to find out the price elasticity of demand at point P on the demand curve. Then, draw a tangent to the demand curve at P which cuts the X-axis at L and Y-axis at M. The price elasticity of demand is given by LP/PM. If point P happens to be at the middle of L and M, then, LP = PM or price elasticity of demand is equal to unity. If P happens to be nearer to L than M, then LP will be less than PM or the price elasticity of demand is less than unity. Finally, if P happens to be nearer to M than L then LP is more than PM or the price elasticity of demand is more than unity.

Price Elasticity of Demand and the Demand Curves

Looking at demand curves we can also get an idea of the nature of the demand curve whether it is elastic, inelastic, more elastic, perfectly elastic or perfectly inelastic. Look at the Figure 4.5
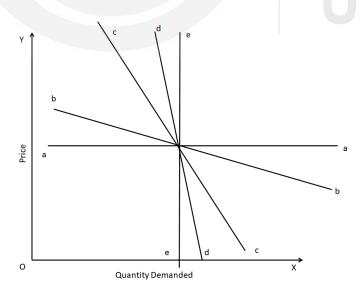

Figure 4.5: Point Elasticity of Demand and the Demand curves

As usual price is measured on Y-axis and the quantity demanded is measured on X-axis. The lineee represents a case of perfectly inelastic demand since the change in price of the commodity does not bring about any change in quantity demanded of the commodity. The lineoa represents case of perfectly elastic demand since at a given price so we can demand as much as we like. The line dd is highly inelastic since it is nearer to perfectly inelastic demand curve or because a given change in price brings about a small change in quantity demanded. The line bb is highly elastic since it is nearer to perfectly elastic line or because a given change in price brings about relatively a big increase in quantity demanded of the commodity. The line cc is moderately elastic. We can make a few generalizations looking at figure 4.5. The less steep is the demand curve more elastic it tends to be or the steeper is the demand curve less elastic it tends to be.

A Case of Unit Price Elastic Demand Curve

Using the outlay method discussed in 4.6, we can have a case of unitary price elastic demand curve. Look at Figure 4.6.

On X-axis quantity demanded of the commodity is measured and as the Y-axis it is the price of the commodity which is measured. DD is the demand curve. At point a on the demand curve at OP_o, price OQ_o, quantity is demanded. The total money spent on the commodity or outlay is $OP_o \times OQ_o$

which is geometrically equal to the area of the rectangle which has sides equal to OP_o and OQ_o. This area is given by $OQ_o a\, P_o$. Now, if price of the commodity falls to OP_1, at which quantity demanded is OQ_1, which is given by point b on the demand curve, then outlay is given by $OQ_1 bP_1$. If the outlay at a which is $OQ_o.ap_o$, is equal to outlay at b which is $OQ_1 bP_1$, than price elasticity of demand at point a and b is unit. If all such rectangles are constructed whose area is equal to each other, then the curve drawn joining all such points given us a demand curve which has the same price elasticity of demand throughout the curve. Such a curve is known as a demand curve which has unitary price elasticity of demand. Such a demand curve is also referred to as 'Rectangular Hyperbola'.
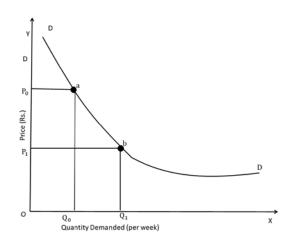

Figure 4.6 : Unit Price Elasticity of Demand

4.4 DETERMINANTS OF PRICE ELASTICITY OF DEMAND

There are a number of factors on which the price elasticity of commodity depends. Some of the important factors affecting price elasticity of demand are discussed below:

1. **Nature of the Commodity:** The commodities are normally divided into three categories (1) necessities, (ii) comforts, and (iii) luxuries, if the commodity happens to be a necessity price elasticity of demand will be less. Take the case of wheat. Even if the price of wheat rises people will not be able to reduce much the quantity demanded of wheat and therefore, the demand for wheat is relatively less elastic. In the case of comforts, the change in price makes the consumer change the quantity demanded relatively more and so it is more elastic. As regards luxuries, since they are purchased by people who have higher income the demand does not change much with change in price and thus tend to be less price elastic.

2. **Number of Substitutes:** Commodities with few and poor substitutes – wheat and salt, for example, will always tend to have low price elasticity of demand. Commodities with many substitutes – wool, for which cotton and synthetics can be substituted for example, will have relatively high price elasticity of demand.

3. **Number of uses of a commodity**: The greater the number of possible uses of a commodity, the greater its price elasticity of demand will be. Thus a commodity, such as coal - which can be used in producing power generation, domestic purposes and industrial purposes - will have higher price elasticity of demand than a commodity with only one or a very few uses – butter, for instance.

4. **Price level of a commodity:** The level of price will also have an impact on price elasticity of demand. A commodity like a box of matches which has a very low price will have less price elasticity of demand. A commodity like car which has a very high price will also tend to have less price elasticity of demand since it is demanded by persons who have very high incomes. A medium price commodity like fan will have relatively more price elasticity of demand.

There can be so many other factors which can also be incorporated in the list. The most important point to remember is that the factors affecting price: elasticity of demand are to be taken together before we can finally say whether or not the price elasticity of demand of a commodity is high or low.

Tabulation of the Different Factors that Affect Elasticity of Demand

	Tend Towards elasticity	Tend Towards Inelasticity
1.	Long period	Short period
2.	Availability of substitutes	Lack of substitutes
3.	Luxuries, comforts	Necessities

4.	Large proportion of expenditure	Small proportion of expenditure
5.	Perishable goods	Durable goods
6.	Multi-purpose goods	Single-use goods
7.	Substitute goods	Complementary goods
8.	Low income	High income
9.	Normal price range	Extremely high or low price
10.	Normality	Habit
11.	Urgent want	Postponable want
12.	Recurring demand	Non-recurring demand

4.5 IMPORTANCE OF PRICE ELASTICITY OF DEMAND

The price elasticity of demand is very important in a number of policy decisions. It is especially useful for government policies relating to individual commodity markets. Some of the important fields in which the importance of price elasticity of demand can be realized are discussed below:

1. **Price fixation by a monopolist:** The monopolist is always interested in charging a higher price from the consumer. If he comes to know that the price elasticity of demand of a commodity is low, he would fix up a higher price for the commodity. He would not be able to charge a very high price for a commodity whose price elasticity of demand is relatively higher.

2. **Price support programme of the government:** Normally, the price elasticity of demand of agricultural commodities like wheat, rice etc, is relatively less. This implies that a given increase in supply say because of better monsoon will lead to a relatively more fall in price. This would reduce the income of the farmer. The government in order to protect the interest of the farmers can announce what is called price support programme such that the price of the commodity will not be allowed to fall below a particular level. Obviously, this would lead to a situation where the quantity supplied will be more than the quantity demanded of a commodity at the price announced by the government.

   Therefore, the government has to be prepared to procure the excess supply of the commodity from the farmers. Similarly, if for some reasons the quantity supplied of a commodity falls which has low price elasticity of demand, the price will tend to be higher and the consumer will be forced to pay relatively higher price. In order to protect the interest of the consumer, the government can announce what is called 'ceiling price' which is a price beyond which the farmer will not be allowed to charge. Whenever the government fixes a price less than what would have prevailed in the market otherwise, the quantity demanded of the commodity will be more than the quantity supplied at the price fixed by the government. The government in order to meet the excess demand of the commodity will either have to release stocks from its godowns or will have to import the commodity from other countries.

3. **Incidence of indirect taxes:** A government imposes indirect taxes on the commodities. Whenever an indirect tax is imposed, the burden of this tax

is borne partly by the consumer and partly by the producer himself. The share of burden of an indirect tax borne by the consumer and the

producer depends upon $= \dfrac{\text{Price elasticity of Supply}}{\text{Price elasticity of demand}}$

For example, a situation where Price elasticity of demand the demand curve is perfectly inelastic, irrespective of the shape of the supply curve, the whole burden of the indirect tax will be borne by the consumer, on the other hand if the demand curve is perfectly elastic the whole burden of the indirect tax will be borne by the producer or the supplier. The situations between two will be decided by the ratio of price elasticity of supply to price elasticity of demand.

Time to Play Game!

Arrange the following elasticity coefficients in ascending order, *i.e.*, smaller value first, next higher value and so on.

$e_p = 0$

$e_p = -1.5$

$e_p = -1.4$

$e_c = +0.1$

$e_c = -0.2$

$e_y = -0.3$

$e_y = +0.5$

where e_p = price elasticity of demand.
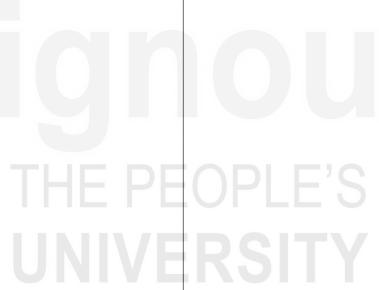
e_c = cross elasticity of demand,

e_y = income elasticity of demand.

Pick up the correct answer among the following:

(a) The lowest value is zero and the highest value is -1.5.

(b) The lowest value is -1.5 and the highest value is +0.5.

(c) The lowest value is zero and the highest value is 0.5.

(d) The first highest and the second highest values are zero and 0.5 respectively.

Ans.(*a*)

Check Your Progress B

1. What is the point method to measure price elasticity of demand?

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2. Explain the outlay method taking a numerical example.

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3. Show that the price elasticity of demand is not the same throughout the demand curve.

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4. What is meant by price elastic demand and price inelastic demand?

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5. When does the demand curve have unity price elasticity of demand?

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6. Explain three factors on which the price elasticity of demand of a commodity depends.

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7. Explain the use of price elasticity of demand in price support programme of the government.

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8. State whether the following statements are **True** or **False.**

    i)   If price of a commodity increases and outlay falls it is a case of less than unity price elasticity of demand.

    ii) Using outlay method, we can never have unity elasticity of demand.

    iii) The price elasticity of demand of a curved demand curve is always unity.

    iv) Less steep a demand curve, more is the price elasticity of demand.

    v)   Nature of the commodity does not influence the price elasticity of demand.

    vi) Less are the substitutes, more is the price elasticity of demand.

vii) Price support programme is the situation where the price of a commodity is not allowed to fall below the level what has been announced by the government.

viii) Less price elastic a demand curve, given the supply curve, more is the burden of an indirect tax on the consumer.

9   Fill in the blanks with the appropriate words provided in the brackets

i)   Outlay method is used when the changes in price and demand are

.........(small/large)

ii) When price of the commodity rises and outlay also rises this case is known as elasticity of demand having .... (less than unity/more than unity)

iii) If the number of possible uses of a commodity is greater, its price elasticity of demand will be .... (lesser/greater)

iv) The government announce ceiling price ....

(to protect the consumer's interest/to earn profit)

v)   The burden of indirect tax is borne partly by the consumer and

.... by the producer. (partly/wholly)

4.6   LET US SUM UP

The concept of elasticity of demand is the responsiveness of demand to a given change in an independent variable such as the price of the commodity in question, income of the consumer, price of a commodity related to the commodity in question.

Price elasticity of demand is the responsiveness of demand to a given proportional change in the price of the commodity. Income elasticity of demand is the responsiveness of the demand of the commodity to a given change in the income of the consumer. Price cross-elasticity of demand is the responsiveness of demand to a given change in the price of the commodity other than the commodity in question. The other commodity can be a substitute or a complement to the commodity in question. Normally, the co-efficient of price elasticity of demand is negative. But the co-efficient of income and price cross-elasticity of demand may be positive or negative.

Price elasticity of demand can be measured by the point method which is used whenever the changes in price and quantity demanded are very small. Outlay method is employed to determine the direction of price elasticity of demand which may be unity, more than unity or less than unity. Geometrical method is employed to find out price elasticity of demand at a given point on the demand curve. We can have a demand curve which may have the same price elasticity of demand throughout the demand curve. Such a curve is called 'Rectangular Hyperbola'. The nature of the commodity-necessity, comfort or luxury-the number of substitutes of the given commodity, the number of uses to which the commodity can be put and the price level of the

commodity are sources of the factors on which the price elasticity of demand of a commodity depends.

The concept of price elasticity of demand can be put to a number of uses. It helps the government to fix the support price or the ceiling price of a commodity. It can also help the monopolist to fix the price of the commodity. Further, it helps us to find out what share of an indirect tax will be borne by the consumer.

4.7 KEY WORDS

Ceiling Price: It is a price fixed up by the government for a commodity above which the price cannot rise.

Complementary Commodity: It is the commodity whose demand is directly related to the demand of the commodity in question.

Dependent Variable: A variable which changes only with the change in the independent variable.

Elasticity of Demand: It quantifies the relationship between the quantity demanded of commodity and the price of the commodity or income of the consumer or price of another commodity which is related to the commodity in question.

Floor Price: It is a price fixed up by the government for a commodity below which the price cannot fall.

Income Elasticity of Demand: It is the responsiveness of demand to a given proportional change in the income of the consumer.

Independent Variable : A variable which can change independently.

Indirect Tax: It is imposed by the government the incidence of which can be shifted to a person other than on whom is imposed.

Monopolist: A producer who controls the whole supply of a commodity.

Outlay: It is the total money spent on the purchase of a commodity at a given price.

Cross-Elasticity of Demand: It is the responsiveness of demand to a given proportional change in the price of the commodity related to the commodity in question

Price Elasticity of Demand: It is the responsiveness of demand to a given change in the price of the commodity.

Rectangular Hyperbola: It is a curve in which any rectangular drawn has the same

Substitute Commodity: It is the commodity whose demand is inversely related to the demand of the commodity in question.

4.8 ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

6. i) False, ii) False, iii) True, iv) False, v) False,

    vi) False, vii) True, viii) False.

8. i) False, ii) False, iii) False, iv) False,

    v) False, vi) False, vii) True, viii) True.

9. i) large, ii) less than unity, iii) greater,

    iv) to protect the consumer's interest. v) partly.

4.9 TERMINAL QUESTIONS

1) Explain the concept of price elasticity of demand, income elasticity of demand and price cross-elasticity of demand.

2) Discuss the outlay method to find out price elasticity of demand.

3) Explain the case of unitary elastic demand curve.

4) Explain the cross-elasticity of demand of a substitute and a complement.

5) What are the main determinants of price elasticity of demand?

6) Explain some uses of the concept of price elasticity of demand.

> **Note: These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University. These are for your practice only.**

UNIT 5   LAW OF SUPPLY AND ELASTICITY OF SUPPLY

Structure

5.0   OBJECTIVES

After studying this unit, you should be able to:

- explain the meaning of the term supply of a commodity
- list the determinants of supply of a commodity
- describe the concept of supply function
- explain the concept of supply schedule
- draw the supply curve
- distinguish between change in supply and quantity supplied
- explain the concept of elasticity of supply
- distinguish between different types of supply curves based on elasticity of supply.

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5.1 INTRODUCTION

In the previous unit you have learnt the effect of increase in inputs to total: production. In this unit you will study how does a producer respond to production of a commodity with a given increase in price of that commodity. You will also learn the law of supply, supply function, supply schedule and supply curve. You will also be acquainted with the various determinants of supply of a commodity and the concept of elasticity of supply and its determinants.

5.2 THE CONCEPT OF SUPPLY

Supply refers to the quantity of a commodity that producers are willing to produce and sell at a given price per unit of time. The word 'supply' has the following features.

1) The supply of a commodity is stated in quantitative terms as the desired quantities.

2) The supply of a commodity is always with reference to the price at which the desired quantity is supplied. For example, to say that producers of blankets are supplying one thousand blankets does not carry any economic meaning. At the same time, if it is stated that producers supply one thousand blankets at a price of Rs 500 per blanket, "supply" will start conveying economic meaning.

3) The supply is always measured as a flow or expressed with reference to a unit of time which may be a day, a week, a fortnight, a month, or a year or any other period of time.

Let us take an example. Consider the statement: "Producers supplied 1,000 blankets at a rate of Rs 500 per blanket during December 2020". This statement mentions the quantity supplied, the price per unit at which the quantity is supplied and also the period during which the quantity is supplied. So, it is a complete statement about the supply of a commodity.

Formally, supply of a commodity refers to the quantity that a producer is willing to sell at different prices.

Table5.1 : Differences between Concept of 'Stock' and 'Supply'

Stock	Supply
1. It implies the volume of a commodity which can be brought into the market for sale at short notice (i.e. 'Stock' is a potential supply).	It implies the quantity of a commodity which is actually brought into the market for sale.
2. The stock or inventories of a commodity include:	Market sale of the commodity is only a part of the total stock.

a) unsold quantity of the previous period, b) excess of present production of the commodity over its present sale.	
3. The stock of a commodity depends mainly upon: a) the production of the commodity b) the procurement price of the commodity, c) the storage and transport costs, etc.	The supply of a commodity depends mainly upon the market price of that commodity.
4. The concept of 'stock' has no time dimension (i.e. we do not say: stock of any commodity per week or month, etc.)	The concept of 'supply' has a time dimension, (i.e. we usually say, the supply of a commodity per day, per week, per month, etc.)
5. In the case of highly perishable commodities, the 'stock' and 'supply' would almost be the same (since these items cannot be stored for a long period)	In the case of durable commodities, supply consists of only a part of the total stock.
6. The stock or inventories enable a firm to meet (temporary) an unexpected rise in market demand for the product or a sudden fall in its production	The supply or the actual market sale enables the firm to earn sales revenue.
7. The stock of any commodity helps in checking severe fluctuations of market price (say, a steep fall in the price of potatoes during a bumper crop, or a steep rise in its price during crop-failure)	The changes in quantity supplied during any particular period, however, depend on the fluctuations in the market price of that commodity.

Determinants of Supply

There are a number of factors which influence the supply of a commodity. It is difficult for us to analyse the effect of a simultaneous change in all the factors which influence the supply of a commodity. Therefore, normally, we think of a situation where one of the factors influencing supply changes, assuming other factors as unchanged, and then work out the effect of a change in that factor on the quantity of the commodity supplied by a producer or a group of producers. It is the same approach which was adopted in unit 3 when the law of demand was discussed where the quantity demanded of a commodity was taken to be dependent on the price of that commodity, other factors influencing demand were assumed as unchanged. Some of the important factors influencing supply or quantity supplied of a commodity can be identified as follows:

1) **Price of the commodity supplied:** The price of a commodity is determined by the forces of demand and supply. Any change in the price of a commodity exerts an influence on the supply of that commodity. Generally speaking, the higher the price of the commodity, the more profitable will it be to produce or supply that commodity, other things remaining unchanged. The direct relationship between price and supply of a commodity is also referred to as the 'Law of Supply'.

   The prices of factors of production or cost of production: A rise in the prices of factors of production raises its cost of production which in turn, lowers profits assuming receipts from sales remain unchanged. A rise in cost of production of a commodity discourages the production or supply of that commodity. Similarly, a fall in cost of production of a commodity encourages its production or supply.

2) A change in the price of one factor of production will cause changes in the relative profitability of producing different commodities. This will cause producers to shift from the production of one commodity to another, and thus cause changes in the supplies of different commodities. For example, a fall in the price of land will have a larger effect on cost of production of an agricultural product and only a very small effect on the costs of producing, say televisions. In other words, cost of production and supply of that commodity will be influenced more with a change in the price of a factor of production which uses relatively more of that factor whose price has changed in relation to other factors of production.

   Price of other goods: Other things remaining unchanged, the supply and production of a commodity will fall as the prices of other commodities rise and vice versa. This happens because normally a producer chooses that commodity for production which earns him the highest profit. For example, a producer chooses to produce, say television sets, because he can earn more profits in this line of production than in the production of any other goods. Now suppose the price of air conditioners goes up in the market. It may now be more profitable to produce air conditioners as compared to the television sets. It encourages the producer to gradually reduce the production of television sets and increase the production of air conditioners. So, a rise in the price of air conditioners tends to reduce the production and supply of television sets.

1) **The state of technology:** The state of knowledge changes over time and along with that the methods employed to produce a commodity also undergo a change. The increase in the knowledge about the means of production and the methods of production lead to lower costs of production of products already being produced and to a large variety of new products. For example, the electronics industry rests upon transistors which have revolutionized - production and supply of televisions along with other electronic equipments like computers. Thus, as knowledge improved supply of different commodities, in which the newer knowledge gets embodied through newer technologies, also increases.

2) **Goal of the producer:** The objective with which the producer undertakes production also influences the supply of the commodity. The

goal of the producer may be to maximize total profits or to maximize sales or to capture the market in the long run.

If a producer wants to earn maximum profits, he will plan to produce that quantity of output which gives him the maximum profit. It does not imply that he cannot produce more but he will not do so because producing more may reduce his profit. Now suppose that the goal of the producer is to maximize sales rather than profits. In that situation he may set a target of less than maximum profits in the short run. He will go on increasing his supply as long as his target is not adversely affected. The goal of maximization of sales is promoted by the desire of the firm to maximize profits in the long run. Similarly, if producers are reluctant to take risks, we would expect smaller production and supply of any commodity which carries more risk.

6) **Other factors:** There can be many other factors influencing supply. Some of other factors are expected changes in government policy, fear of war, unexpected climatic conditions, expected change in prices, growing inequalities of income influencing the demand of particular types of goods and hence making them more profitable to produce.

5.3 THE LAW OF SUPPLY

Let us assume that the overall objective of a producer is to maximize profits which is the difference between total revenue and total cost. Total revenue is the price of the product multiplied by the quantity sold. Total cost is the average cost of production multiplied by the quantity produced.

PROFIT

$= TR - TC \qquad (1)$

$TR = Q. P \qquad (2)$

$TC = Q.AC \qquad (3)$

A higher price would mean more profits, provided there is no change in other factors influencing the supply. Therefore, a producer will be willing to supply more if he expects to get a higher price for his product. Similarly, a producer will be willing to supply less if he expects to get a lower price for his product. So, we observe a direct relationship between the price and the quantity supplied of a commodity. This direct relationship between price and supply of a product is referred to as the 'Law of Supply'. **The law states that as the price of a commodity increases, the quantity supplied, per unit of time, of that commodity also increases and vice versa, assuming all other factors influencing supply remain constant. The law of supply holds good only on the assumption 'other factors remaining constant.** In this direct relationship between the price and the supply of a commodity, the change in supply is caused by the change in price such that change in price is the cause and change in supply is the effect. We can state the same thing differently by saying that price is taken as an independent variable while supply is taken to

be a dependent variable. It is important to understand that the statement "Price rise leads to supply rise" is true and the statement that "Supply rise leads to price rise" is false.

5.3.1 The Supply Function

The supply function is a shorthand expression of the various factors affecting supply of a commodity. Thus, the supply of a commodity can be put as a function of price of that commodity, the price of all other commodities; the prices of factors of production, technology, the objectives of producers and other factors. This relationship must be expressed with the help of following symbols.

$Q_S = f(P_1, P_2, P_3.... P_n, F_1... F_n$ T, O, OF where Q_S stands for the supply of commodity ......P_1 is the price of that commodity, $P_2, P_3...P_n$ are the prices of all other commodities, $F_1.........F_n$ are the prices of all factors of production. T is the state of technology, O is the objective of the producer and OF stands for other factors influencing supply.

In the Law of Supply, we are only concerned with the relation between Q, S and f(P_1), other things remaining constant. In specific terms, what we state in the law of supply is that the quantity of a commodity produced and offered for sale will increase as the price of the commodity rises and decreases as the price falls, other things remaining constant.

5.3.2 The Supply Schedule

A supply schedule shows different prices of a commodity and the quantities which a producer is willing to supply, per unit of time, at each price, assuming other factors influencing the supply to be constant. A supply schedule of a product based on imaginary data is given in Table 5.2 illustrating the relationship between price and quantity supplied as given by the law of supply.

Table 5.2:A Supply Schedule of a Pen Producer

Price (in Rs.) per pen	Quantity Supplied (in thousand) per month
2	25
3	40
4	50
5	60
6	70

The schedule presented in Table 5.2 shows that at a price of Rs 2 per pen the producer is willing to supply 25 thousand pens per month. And at a higher price of Rs 3 per pen he is willing to supply 40 thousand pens per month and as price of pens keep rising he is willing to supply more and more quantity of pens per month as shown in the supply schedule. This supply schedule has

been so drawn as to depict a direct relationship between price per pen and
quantity supplied of pens per month.

5.3.3 The Supply Curve

Look at Figure 5.1, where the data from Table 5.2 has been plotted. Here
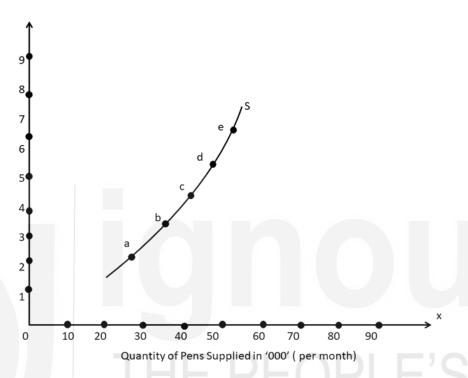price is plotted on the Y-axis and quantity supplied on X-axis.

Figure 5.1: Supply Curve

The graph shows that point labelled a, for example, gives the same
information that is given on the first row of the table; when the price of pens
is Rs 2 per pen, 25,000 pens will be produced and offered for sale per month.
Similarly, points b, c, d, and e on the graph correspond to row 3rd, 4th, 5th
and 6th of table 5.1 respectively. The supply curve S is a smooth curve drawn
through the five points a, b, c, d and e. This curve shows the quantity of pens
that will be produced and offered for sale at each price.

In short, the supply curve for a product depicts the direct relation between the
price of that commodity and the quantity producers wish to produce or sell at
that price. This curve is drawn on the assumption that all other factors (other
than the price of the product) that influence supply are constant (i.e. they
remain unchanged). The upward slope of the supply curve indicates that the
higher the price, the greater the quantity producers will supply. If the supply
curve is extended to the Y-axis, it may or may not pass through O. If it passes
through O, it shows that the quantity supplied is zero at zero price; if it does
not pass through zero, it shows that unless the price 'rises upto a point,
(indicated by a point not shown in the Figure 5.1 at which supply curve cuts
the Y-axis) quantity supplied will remain zero. The upward sloping supply
curve is just a diagrammatic representation of the law of supply.

5.3.4   Exceptions to the Law of Supply

Generally speaking, the law of supply indicates a direct relation between the price and the quantity supplied. There are some exceptions to the law of supply. Some of the exceptions are given below:

1. **Non-maximisation of profits:** In some cases, the enterprise may not be pursuing the goal of maximisation of profits. In that case, the quantity supplied may increase even when price does not rise. For example, if the firm wants to maximise sales even if price remains unchanged, it may like to increase sales so that total revenue can be increased. Sometimes, the firm may be interested to maximise profits in the long run; in the short run, it may pursue some other goals. Similarly, if a firm is controlling a number of companies, it is the profits of all companies taken together which may be sought to be maximised so that for different products produced, the law of supply may not apply for each product.

2. **Factors other than price not remaining constant:** The law of supply was stated on the assumption that factors other than the price of the commodity remain constant. In reality, we notice that factors other than the price of the product may not remain constant. For example, the quantity supplied of a commodity may fall at a given price if prices of other commodities show a tendency to rise. The change in the state of technology can also bring about a change in the quantity supplied of a commodity even if the price of that commodity does not undergo a change.

Check Your Progress A

1) Fill in the blanks:

    i)   Producers supply more at a............ price than at a............ price,

    ii) A supply curve is.............. sloping.

    iii) A supply schedule relates..............of a commodity to its............ offered for sale during the specific period of time.

    iv) A supply curve relates............of a commodity to the............. offered for sale during a particular period of time.

    v)   If price of a commodity.............. the profit from its sale will fall,

    other things remaining unchanged.

    vi) The law of supply states that the price of a commodity and its quantity

    supplied are..... .... related other things remaining unchanged.

2) State whether the following statements are **True** or **False.**

    i)   The law of supply states that there exists a relationship between supply of a commodity and its price.

    ii) The law of supply states that there exists direct relationship between the price of a commodity and its quantity supplied per unit of time, other things remaining constant.

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iii) Supply refers to the quantity of a commodity offered for sale.

iv) Supply refers to the quantity of a commodity offered for sale at a price during a specific period of time.

v) Technological development in a particular field of production is likely to increase cost of production.

vi) New method of organizing an existing productive activity is not a technological development.

vii) The supply is a stock concept.

viii) Profit maximization can be the only objective of every firm.

3) What is the law of supply?

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4) Define supply schedule and supply curve.

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5.4 CHANGES IN SUPPLY VERSUS CHANGES IN QUANTITY SUPPLIED

In sections 5.2 and 5.3 of this unit, the factors influencing supply have been broadly divided into two categories: (a) the price of the commodity in question whose supply is being considered and (b) factors other than the price of the commodity. Based on this distinction between factors, we have another distinction namely, changes in quantity supplied and changes in supply. If the price of a commodity changes and there is a corresponding change in production or amount offered for sale, we call this change in quantity supplied. Similarly, if production of a commodity undergoes a change because of factors other than the price of the commodity, we call this change in supply.

5.4.1 Changes in Quantity Supplied

When the amount offered for sale changes on account of a change in the price of the commodity only, assuming all other factors to be constant, it is termed

as changes in quantity supplied. The changes in quantity supplied can be of two types.

1) When the price of a commodity falls and its quantity supplied falls provided the law of supply applies; it is termed as "**Contraction of Supply**"

2) When the price of a commodity rises and its quantity supplied rises, provided the law of supply applies, it is termed as **"Extension of Supply".**

The 'Contraction' and 'Extension' of supply has been shown in the Figure 5.2.

X-axis quantity of pens supplied are measured and on Y-axis price per pen is measured. S curve is the required supply curve. Start with point a on the supply curve at which price per pen is Rs 3 and quantity supplied is 30,000 pens. As price per pen falls to Rs2 the quantity supplied falls to 20,000 and when price of pen rises to Rs 4, the quantity supplied rises to 40,000. The fall in quantity supplied from 30,000 to 20,000 with the fall in price, from Rs 3 to Rs 2 is termed as **"Contraction of Supply".** On the graph it is the movement from a to c on the supply curve which represents **'Contraction of Supply'.** Similarly, the movement from a to b on the supply curve represents '**Extension of Supply'**, since it implies that the quantity supplied rises from 30,000 to 40,000 with the rise in price from Rs 3 to Rs 4. Thus, changes in quantity supplied are the result of only changes in the price of the commodity in question, other things remaining unchanged.
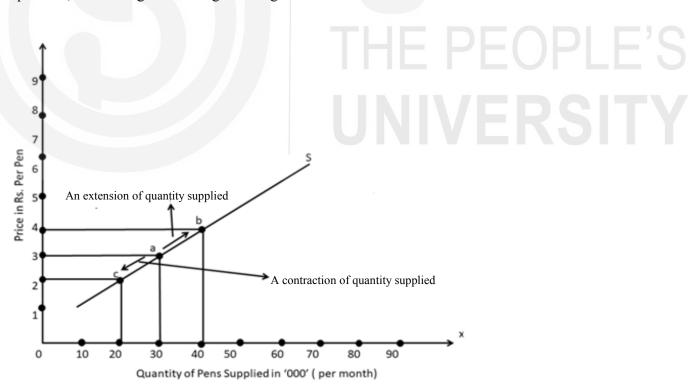

Figure 5.2 : Changes in Quantity Supplied

5.4.2 Changes in Supply

A change in supply means that at each price, a different quantity of a commodity will be supplied than previously. Changes in supply can be two types:

1) **A Decrease in Supply:** When the quantity of a commodity supplied falls, at the same price, it is referred to as a 'Decrease in Supply' which if represented in the form of a curve, implies a leftward shift of the supply curve.

2) **An Increase in Supply:** When the quantity of a commodity supplied increases, at the same price, it is known as an 'Increase in Supply' which amounts to a rightward shift in the supply curve.

Both types of changes in supply are shown in Fig. 5.3. In this diagram, it can be seen that as we move from point a on S curve to a' at price Rs 3, supply or quantity supplied falls from 30,000 to 20,000. Similarly, at Rs 2 price at point c on S-curve, supply was 20,000 which falls to 10,000 at point c'.
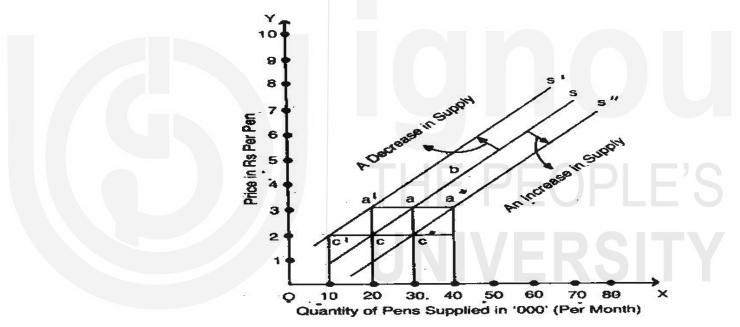
Figure 5.3 : Shifts in Supply Curve

So, if points like c', a' are joined a new supply curve labelled S' can be drawn. This shift in curve from S to S' is referred to as a **'Decrease in Supply'.**

Instead if we move from point a on S-curve to point a", we get increase in supply from 30,000 to 40,000 at Rs 3 price. At price Rs 2, the supply increases from 20,000 to 30,000 as we move from point c to c'. If points like c" and a" are joined, a new supply curve S" is arrived. The shift in supply curve from S to S" is referred to as an '**Increase in Supply'.**

In short, a rise in supply implies a rightward shift of the supply curve showing that producers are willing to supply more at each price. A fall in supply, on the other hand, implies a leftward shift of the supply curve indicating that producers are willing to supply less at each price.

5.4.3 Why Supply Curve Shifts?

The reasons for 'Contraction' and 'Extension of supply' have already been analysed in section 5.4.1 of this unit. The reasons for the changes in supply (both increase and decrease in supply) can be stated as follows:

1) **Change in the prices of other commodities:** A decrease in the prices of other commodities increases the supply of the commodity in question at each price because relatively profits by supplying other products fall. An increase in the prices of other commodities decreases the supply of the commodity in question at each price.

2) **Change in the prices of factors of production:** An increase in the prices of factors of production used in producing the commodity tends to reduce the supply of the commodity at each price, since the cost of production rises and at the given price, profits fall. Conversely, a decrease in the prices of factors of production used in making a commodity leads to an increase in supply, at each price.

3) **Change in technology:** An improvement in technology normally leads to a fall in cost of production and given the price of the product, a producer tends to produce more of that commodity, at each price. Conversely loss in technical knowledge (the chances of which are meagre) will lead to a fall in supply, at each price.

4) **Change or expectation of change in other factors:** Sometimes, supply of a commodity may change because of the change in government policies relating to taxes or rate of interest or because of fear of war or because of changing inequalities of income and wealth which influence the demand of particular types of goods and hence making it more or less profitable to produce that commodity. Accordingly, if producers expect more profits because of change in other factors, supply increases at each price. Conversely, if producers expect less profits because of change in other factors, supply decreases at each price.

Check Your Progress B

1) State whether the following statements are **True** or **False.**

   i) An 'extension of supply' means that at a given price, more is supplied.

   ii) An increase' and 'extension of supply are one and the same thing.

   iii) The quantity supplied changes because of change in technology.

   iv) The supply increases because of a fall in price of the commodity.

   v) A movement along the supply curve shows the operation of the law of supply.

   vi) A shift in the supply curve leftwards indicates an increase in supply.

   vii) A supply curve shifts because of factors other than the price of a commodity.

2) Distinguish between Extension of Supply and Increase of Supply.

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5.5 ELASTICITY OF SUPPLY

The Law of Supply tells us that there is a direct relation between the price of a commodity and its amount supplied, other things remaining unchanged. Elasticity of supply measures the degree to which the quantity supplied responds to price changes.

5.5.1 Concept and Measurement

Elasticity of supply can be defined as the percentage change in amount supplied divided by the percentage change in price of the commodity or we can say that Elasticity of Supply (E_s) is :

$$E_s = \frac{\text{Percentage change in quantity supplied of commodity}}{\text{Percentage change in price of the commodity}}$$

$$= \frac{\dfrac{\text{Change in quantity supplied}}{\text{Orignal Supply}} \times 100}{\dfrac{\text{Change in Price}}{\text{Original Price}} \times 100}$$

$$\frac{\dfrac{\Delta S}{S} \times 100}{\dfrac{\Delta P}{P} \times 100}$$

$$= \frac{\Delta S}{S} \times \frac{P}{\Delta P}$$

$$= \frac{\Delta S}{\Delta P} \times \frac{P}{S}$$

Where S and P are the original quantity supplied and price respectively and ΔS and ΔP are the change in quantity supplied and change in price.

The method of measurement of the elasticity of supply can be illustrated with the help of an example from table 5.1. The price of pen rises from Rs2 to Rs 3 and the quantity supplied of pens rises from 25,000 to 40,000. Using the formula to measure elasticity of supply it is equal to 1.2 as shown below:

$$E_s = \frac{\Delta s}{\Delta P} \times \frac{P}{S}$$

$$= \frac{40,000 - 25000}{3-2} \times \frac{2}{25000}$$

$$= \frac{15000}{1} \times \frac{2}{25000} = \frac{30}{25} = \frac{6}{5} = 1.2$$

$E_s = 1.2$ can be interpreted as a situation where the price of pens going up by say one per cent leads to an increase in quantity supplied of pens by 1.2 per cent or we can say that the situation is of elastic supply. The co-efficient of less than 1 would mean that we have inelastic supply. $E_s = 1$ is a case of unit elasticity of supply. $E_s = 0$ is a case of perfectly inelastic supply and finally,

$E_s = \infty$ is a case of perfectly elastic supply.

5.5.2 Supply Curves with Different Elasticity of Supply

Look at Figure 5.4 which shows five cases of supply elasticity. The case of zero elasticity or perfectly inelastic supply is represented in Figure 5.4 (i) in which the quantity supplied does not change as price changes. This happens when producers insist on producing a given quantity irrespective of the price prevailing in the market. The case of infinity elasticity or $E_s = \infty$ is illustrated in Figure 5.4 (ii), where at price P the producers are prepared to supply as much as the market demands and nothing at all is supplied at a price less than OP. A small increase in price to OP leads to supply rising from zero to an infinity.

The case of unit elasticity of supply is shown in Figure 5.4 (iii). Any straight line supply curve passing through the origin has an elasticity of supply equal to unity. This can be easily proved. Consider two triangles with sides A Q and A P and OQ and QP. They are similar and therefore the ratio of sides is equal i.e.,
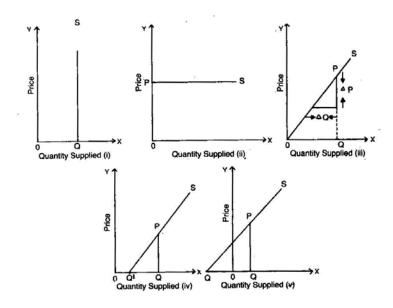
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Figure 5.4 : Supply Curves with Different Elasticities of Supply

$$\frac{QP}{\Delta P} = \frac{OQ}{\Delta Q}$$

Or

$$\frac{\Delta Q}{\Delta P} = \frac{OQ}{QP}$$

Elasticity of supply given in section 5.5.1 of this units is

$$= \frac{\Delta S}{\Delta P} \times \frac{P}{S}$$

In terms of figure 5.4 (iii) elasticity of supply can be put as

$$= \frac{\Delta Q}{\Delta P} \times \frac{QP}{OQ}$$

Substituting $\frac{\Delta Q}{\Delta P}$ by $\frac{O\theta}{\theta P}$ as given in (i) we have

$$= \frac{OQ}{QP} \times \frac{QP}{OQ} = 1$$

Figure 5.4 (iv) illustrates the case of elasticity of supply as being inelastic or less than unity. At point P,

$$Es = \frac{Q'Q}{PQ} \times \frac{PQ}{OQ}$$

$$= \frac{Q'Q}{OQ} \ or \ < 1 \ \text{Since, Q'Q< OQ}$$

Figure 5.4(v) illustrates the case of elasticity of supply as being elastic or more than unity. At point P Es is

$$= \frac{Q'Q}{PQ} \times \frac{PQ}{OQ}$$

$$= \frac{Q'Q}{OQ} \ or > 1 \ since, Q'Q > OQ$$

Here, if a straight line supply curve from through the quantity axis, the elasticity of supply in less unit. On the other hand, if a straight line supply curve passes through the price axis, the elasticity of supply is more than unit. And if a straight line supply curve passes through the origin, the elasticity of supply is equal to unity. If the supply curve is not a straight live, it is a curilinear supply surve in that case what we do to find out elasticity of supply at a particular point on the supply curve in the draw a tangent to the supply curve at the point and see whether the tangent passes through the origin or quantity axis or price axis. This is shown in figure 5.5.

In figure 5.5, s in the curvilinear supply curve and we are interested to find out the clasticity of supply at point P. If the sagment the supply curve passes through quanity x-axis, the elasticity of supply is less than unity. In the diagram, tangent to the supply curve at point P actually passes through the origin and so it has that elasticity of supply equal to unity.

BRAIN TEASERS

1. **If the quantity supplied increases by 15 per cent in response to a 15 per cent increase in price, what is the nature of elasticity of supply?**

    Ans. The supply of the commodity would be said to be unit elastic. This can be worked out as follows:

    $$E_s \quad = \quad \frac{\text{Percentage Change in Quantity Supplied}}{\text{Percentage Change in Price}}$$

    $$= \frac{15\%}{15\%} = 1$$

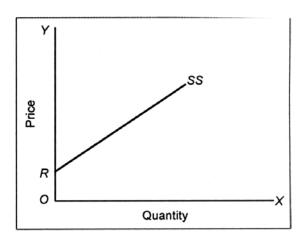2. **If the supply elasticity coefficient is 3, what does it indicate?**

    Ans If indicates that 1 per cent increase in price will result in a 3 per cent increase in quantity supplied.

3. **If in response to a 10 per cent increase in price, quantity supplied increase by 15 per cent, what shall be the elasticity coefficient?**

    Ans. The elasticity coefficient will be 15/10 = 1.5.

4. **Show diagrammatically the concept of reserve price.**

   Ans. Reserve price is the minimum floor price below which the producer does not offer any quantity for sale. In Fig. OR is the reserve price.

5. **When the price of a doll is Rs. 4, a doll maker supplies 8 dolls per day. If the price rises to Rs.5 per doll, he is willing to supply 10 dolls per day. Calculate the price elasticity of supply of dolls.**

   Ans.

   $$E_s \quad \frac{\Delta Q}{\Delta P} \times \frac{Q}{P}$$

   Putting the given values, we get

   $$E_s \quad \frac{2}{1} \times \frac{4}{8} = 1$$

   The price elasticity of supply of dolls is unit elastic, i.e. a 25 per cent increase in price will result in a 25 per cent increase in quantity supplied.

6. **A seller of potatoes sells 80 quintals a day when the price of potatoes is Rs. 4 per kg. The elasticity of supply of potatoes is known as be 2. How much quantity will this seller supply when the price rises to Rs.5 per kg?**

   Ans.

   $$E_s \quad \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

   Putting the given values, we get

   $$= \frac{2X}{1} \times \frac{4}{80}$$

   $$= 0$$

$$2 = \frac{4X}{80}$$

or $\qquad 4X = 80 \times 2 = 160$

$\qquad X = 160/4 = 40$

i.e. the value of ΔQ is 40. Since the price has increased, the quantity supplied will increase by 40 units. The new quantity supplied will be 80 + 40 = 120 quintals.

7. **Price elasticity of supply of a good is** Rs.**5. A producer sells 500 units of this good at** Rs. **5 per unit. How much will he be willing to sell at the price of** Rs. **6 per unit?**

Ans. $\qquad E_s \dfrac{\Delta Q}{\Delta P} \cdot \dfrac{P}{Q}$

Given $\qquad = \dfrac{5X}{1} \cdot \dfrac{5}{500}$

We have to find the value of ΔQ (or X)

Solving for X, we get

$\qquad 500 \times 5 = 5X$

$\therefore \qquad X = 500$

At Rs. 6, the producer would be willing to sell 500 + 500 = 1000 units.

8. The price elasticity of supply of a commodity is 2.5. At a price of Rs. 5 per unit, its quantity supplied is 300 units. Calculate its quantity supplied at a price of Rs. 4 per unit.

Ans. $\qquad E_s \dfrac{\Delta Q}{\Delta P} \times \dfrac{P}{Q}$

Putting the values, we get

$$2.5 = \frac{\Delta Q}{-1} \times \frac{5}{300}$$

$= 0$

Let $\Delta Q = x - 300$.

Then,

$$2.5 = \frac{X-300}{-1} \times \frac{5}{300}$$
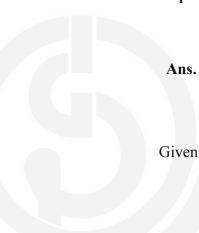
Rearranging, we get

Solving, we get

$$150 = \frac{X-300}{-1}$$

$$-150 = x - 300$$

$$X = -150 + 300 = 150$$

Quantity supplied = 150 units

9. **At a price of ` Rs.8 per unit, the quantity supplied of a commodity is 200 units. Its price elasticity of supply is 1.5. If its price rises to Rs. 10 per unit, calculate the quantity supplied at the new price.**

Ans. Let

$$E_s = \frac{P}{Q} \times \frac{\Delta Q}{\Delta P}$$

Given

$$1.5 = \frac{8}{200} \times \frac{\Delta Q}{2}$$

Let

$$\Delta Q = X - 200$$

Then,

$$1.5 = \frac{8}{200} \times \frac{X - 200}{2}$$

Or

$$1.5 = \frac{x - 200}{50}$$

$$1.5 \times 50 = x - 200$$

or

$$75 + 200 = X$$

$$X = 275$$

The quantity supplied is 275 units.

Hence,

(i) If a straight line supply curve passes through the quantity axis, the elasticity supply is less than unity.

(ii) If a straight line supply curve passes through the price axis, the elasticity of supply is more than unity.

(iii) If a straight supply curve passes through the origin, the elasticity of supply is equal to unity.
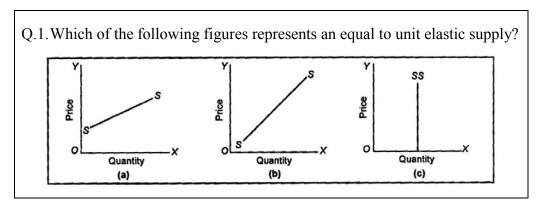

ELASTICITY OF SUPPLY ON A LINEAR CURVE

If supply curve is not a straight line, it is a curvilinear supply curve, in that case what we do to find out elasticity of supply at a particular point on the supply curve is to draw a tangent to the supply curve at the point and see whether the tangent passes through the origin or quantity axis or price axis. This is shown is Figure 5.5.

Figure 5.5 : Curvilinear Supply Curve
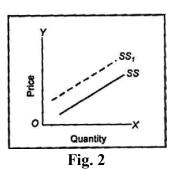
In Figure 5.5 S is the curvilinear supply curve and we want to find out the elasticity of supply at point P. If the tangent to the supply curve passes through quantity X-axis, the elasticity of supply is less than unity. In the diagram tangent to the supply curve at point P actually passes through the origin and so has the elasticity of supply equal to unity.

Q.1. Which of the following figures represents an equal to unit elastic supply?

Fig. 1

Ans. Fig. 1 (b)

Q.2. Due to of heavy rainfall and consequent landslides, transportation of apples from Kashmir to Delhi gets disrupted. Show the situation with the help of a supply curve.

Ans. Supply of apples will decrease. Supply curve will shift to the left as in Fig. 2

Fig. 2

Q.3. Give reasons for the following:

(i) Variable factor proportions obtain in the short-run.

(ii) Fixed factor proportions obtain in the long-run.

Ans. *(i)* Short-run is a period of time in which some factors are variable, and at least one factor is fixed. The level of output in a firm can be increased only by increasing the quantity of variable factors. The quantity of fixed input remains unchanged at different levels. Therefore, when variable factors are increased, whereas the quantity of fixed factor remains unchanged, the proportions between variable factors and fixed factors get changed. These are known as Variable factor proportions.

(ii) In the long-run, all the factors become variable. Therefore, when the scale of production of a firm is increased, quantity of the factors is increased in a given proportion. These are known as Fixed factor proportions.

Q.4. State with reasons if the following statements are true or false:

(i) When the quantity of a variable input is increased from 3 units to 4 units, the total output increases from 70 units to 85 units. The marginal product of the variable input is 15 units.

(ii) When the quantity of a variable input is increased from 4 to 6 units, the total output increases from 85 units to 105 units. The marginal product of the variable input is 20 units.

(iii) When the marginal product of a variable input falls, total product also falls.

Ans. *(i)* *True*: Marginal product of a variable input in addition to total output due to one unit increase in variable input.

(ii) *False*: Marginal product is addition to total output due to one unit

increase in variable input. Here, total output increases by 20 units due to two units increase in variable input. Hence, marginal product is 20/2 = 10 units.

(iii) False: Total product is defined as:

$TP = MP_1 + MP_2 + \ldots\ldots + MP_N$. Thus, as long as MP is more than zero, TP keeps rising, although MP maybe diminishing.

Q.5. Giving reasons, state whether the following statements are true or false:

(i) If marginal product rises, average product must also rise.

(ii) If marginal product falls, average product must also fall.

(iii) If marginal product becomes negative, average product must also become negative.

Ans. *(i) True*: Rising marginal product implies that the total product increases at an increasing rate. This pulls up the average product also.

(ii) False: There may be an intermediate stage when the marginal product may be falling, the average product keep rising. This occurs when the fixed inputs are better utilized.

(iii) False: Marginal product can be negative, but the average product can never be negative, because total product will always be a finite quantity.

Q.6. Give reasons for the following:

(i) Even when marginal product falls, total product keeps rising.

(ii) Total product is maximum when marginal product is zero.

(iii) Total product begins to fall when marginal product becomes negative.

Ans. The reason for all *(i), (ii)* and *(iii)* is in the definition of total product (TP).

TP is the sum total of $MP_1 + MP_2 + \ldots\ldots + MP_N$.

Q.7. Give reasons for the following:

(i) Average Fixed Cost Curve is a Rectangular Hyperbola.

(ii) Marginal Cost Curve is a U-shaped curve.

(iii) While MC rises, AC can be falling for some range.

Ans. *(i)* Average fixed cost is defined as TFC ÷ TP. Total Fixed Cost is the sum total of expenses incurred on fixed inputs during the process of production. The quantity of fixed inputs remains the same at different levels of output. Hence, the TFC remains the

same at different levels of output. AFC, therefore, continuously falls as the level of output increases.

(ii) The shape of marginal cost curve is determined by the law of variable proportions which gives us an inverted-U shape of the marginal product curve. MC curve is the mirror image of the MP curve.

(iii) MC rises while AC may continue to fall in the range when the rate of fall in average fixed cost is more than the rate of increase in average variable cost.

Q.8. Give reasons for the following:

(i) Demand curve displaying a perfectly competitive firm is a horizontal straight line.

(ii) Demand curve displaying a monopolistic competitive firm is a downward sloping curve.

(iii) Demand curve displaying a monopoly firm is less elastic than that curve facing a monopolistic competitive firm.

Ans. *(i)* Under perfect competition, every firm is a price-taker firm. The price is set by industry demand and supply. Therefore, every firm faces a horizontal straight line demand curve indicating that it can sell any quantity at the given price.

(ii) A monopolistic competitive firm has to design its own pricing strategy. It can expect to sell larger quantity at a lower price, arid vice-versa. Hence, its demand curve slopes downwards.

(iii) A monopolist is the only producer of a good which has no near substitutes. A monopolistic competitive firm, on the other hand, produces a good that has several close substitutes. Hence, the demand curve facing a monopolistic competitive firm is more elastic man that faced by a monopoly firm.

5.5.3 Determinants of Elasticity of Supply

Elasticity of supply depends on a number of factors and all these factors are to be taken together before one can comment on the elasticity of supply of a commodity. Some of the important determinants of elasticity of supply are given as follows:

1) **Behaviour of costs as output varies:** As output of a commodity rises total cost does show a tendency to rise but it does not rise at a uniform rate. Normally, total cost rises at a falling rate in the beginning, then at a constant rate and finally at a rising rate. If cost of production rises rapidly as output rises, then there is less stimulus to expand production in response to rise in price and accordingly supply will tend to less elastic. If, on the other hand, total costs rise but rather slowly as production

increases, a rise in price which raises profits will bring about a large increase in quantity supplied and so, the supply will be more elastic.

2) **Nature of the commodity:** Commodities may be classified, based on their nature, into (i) perishable and (ii) durable. Perishable products cannot be stored and thus, their supply does not respond very much to the change in their prices. So, supply of perishable products is inelastic. Durable products, on the other hand, can be stored and their supply responds to the change in their prices. The supply elasticity of durable products is relatively elastic.

3) **Time:** Supply of a commodity comes from its production which involves a time-lag. If the size of the plant is given and other adjustments in terms of technology etc., are not allowed, a producer cannot effectively respond to the change in price. Under such a situation i.e., in the short-run; supply of a commodity is less elastic. In the long run, when the size of the plant can be changed and technological changes are also allowed supply responds to the change in price and hence, elasticity of supply is more elastic or the supply curve becomes flatter.

4) **Price expectations:** Expectation of future prices also influences elasticity of supply. If the producers expect that prices in the future will not be allowed to fall below a particular level, they would not mind producing more. Further if, producers expect prices to rise in the future they may hold more stocks and may supply less quantity in the market. Supply in such a case will be inelastic. If the prices are expected to fall in the future, supply will be more elastic.

5) **Nature of techniques of production:** If techniques of production required to produce a commodity are simple, the producer responds to a rise in price and supplies more which makes supply more elastic. More complex and cumbersome the techniques of production required to produce a commodity, more difficult it will be for the supply to respond to rising price and, therefore, less elastic will be the supply.

Check Your Progress C

1) What is elasticity of supply?

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2) List three important determinants of elasticity of supply?

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3) State whether the following statements are **True** or **False.**

i) Elasticity of supply explains the reasons for the law of supply to apply.

ii) Elasticity of supply can be found out even if the law of supply does not apply.

iii) Elasticity of supply is the responsiveness of price to a given per cent change in quantity supplied.

iv) A case of elastic supply implies when a given per cent rise in price leads to the same percent rise in quantity supplied.

v) Perfectly elastic supply curve is parallel to Y-axis.

vi) Inelastic supply curve passes through the quantity axis.

vii) Elasticity of supply of a curvilinear supply curve is unity throughout the curve.

viii) Short run supply curve of a commodity is generally less elastic than the long run supply curve.

5.6   LET US SUM UP

Supply of a commodity is always with reference to: (a) Price of the commodity, (b) quantity supplied at that price, and (c) quantity supplied over a period of time. Supply of a commodity is determined by (a) Price of the commodity, (b) Prices of other commodities, (c) cost of production of the commodity, (d) technical knowledge available with the producer, (e) goal of the producers, and (f) other factors like government policies, fear of war, growing inequalities of income and wealth, etc.

The law of supply shows direct relationship between price of the commodity and the quantity supplied of that commodity per unit of time; other things remaining unchanged. A supply function represents the factors on which the quantity supplied of a commodity depends. A supply schedule shows different prices and the quantities of the product supplied at each price. A supply curve is upward sloping from left to right.

A supply curve shifts when there is a change in supply due to the influence of one or more factors other than the price of the commodity. A movement along the supply curve means change in quantity supplied due to the change in the price of the commodity only, other factors influencing supply remaining constant. A rightward shift of the supply curve represents a situation of 'increase in supply' and a leftward shift of the supply curve shows a situation of 'decrease in supply'. A rightward movement along a supply curve is a case of 'extension in supply' and a leftward movement along a supply curve is a case of 'contraction in supply'.

Elasticity of supply is the percentage change in amount supplied divided by the percentage change in price of the commodity. Elasticity of supply can be unity, more than unity or less than unity. In the case of perfectly inelastic supply, elasticity of supply is zero and in the case of perfectly elastic supply, elasticity of supply is infinity.

Perfectly inelastic supply curve is parallel to price axis. Perfectly elastic supply curve is parallel to quantity axis. The supply curve with unit elasticity of supply rises upwards passing through the origin. The supply curve with less than unity elasticity of supply rises upwards passing through the quantity axis. The supply curve with more than unity elasticity of supply rises upwards passing through the price axis. The elasticity of supply on a curvilinear supply curve is given by the tangent drawn on the supply curve at a point at which elasticity of supply is to be found. The determinants of elasticity of supply are the behaviour of costs as output varies, nature of the commodity, time, price expectations and nature of techniques of production.

5.7 KEY WORDS

Change in Supply: It is the change in quantity supplied at a given price.

Change in Quantity Supplied: It is the change in quantity supplied because of change in price of the commodity.

Contraction in Supply: The decrease in quantity supplied because of a fall in the price of the commodity.

Curvilinear Supply Curve: The supply curve which is not a straight line.

Decrease in Supply: The decrease in quantity supplied at a given price of the commodity.

Elasticity of Supply: The responsiveness of quantity supplied to a given percentage change in the price of the commodity.

Elastic Supply: The percentage change in quantity supplied is more than the percentage change in the price of the commodity.

Extension in Supply: The rise in quantity supplied due to a rise in the price of the commodity.

Flow Variable: Any variable measured over a period of time.

Inequalities of Income: The distribution of income among different income groups of an economy.

Increase in Supply: The rise in quantity supplied at a given price of the commodity.

Inelastic Supply: The percentage change in quantity supplied is less than the percentage change in the price of the commodity.

Law of Supply: It shows the direct relationship between the price of a commodity and its quantity supplied, other factors influencing supply (except price of the commodity) remaining constant.

Perfectly Inelastic Supply: The quantity supplied remains the same at different prices of the commodity.

Supply: Quantity of commodity that the sellers would be willing to sell at a price during a given period.

Supply Function: It is the functional relationship between different factors exercising influence on the quantity supplied.

Supply Schedule: A table having two columns, one showing different prices of the commodity and the other showing quantities supplied during a given period at each of these prices.

Supply Curve: A curve showing the relationship between price of a commodity and its quantity supplied during a given period, other factors influencing supply remaining unchanged.

Technology: The method employed to produce a commodity or service.

5.8 ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

1. i) higher, lower ii) upward iii) price, quantity iv) price, quantity, v) falls vi) directly

2. i) False ii) True iii) False iv) True v) False vi) False, vii) False viii) False

Check your progress B

1. i) False ii) False iii) False iv) False v) True vi) False, vii) True

Check your progress C

3. i) False ii) True iii) False iv) False v) False vi) True vii) False, viii) True

5.9 TERMINAL QUESTIONS

1) What is the meaning of the term 'Supply'? Answer with the help of an example.

2) Explain the various determinants of Supply of a commodity.

3) Explain the Law of Supply. Point out its exceptions.

4) Distinguish between 'Extension in supply' and 'Increase in supply'. Give examples.

5) Explain the significance of 'Movement along the Supply Curve' and distinguished it from 'Shift of the Supply Curve'.

6) Distinguish between Perfectly Elastic, Perfectly Inelastic, Unit Elastic, Inelastic and Elastic supply curves with the help of diagrams.

7) What are the main determinants of Elasticity of Supply of a Commodity?

> **Note: These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University. These are for your practice only.**

UNIT 6 APPLICATIONS OF DEMAND AND SUPPLY

Structure

6.0   OBJECTIVES

After studying this unit, you should be able to:

- Understand how price is determined using demand and supply and how with shift in demand and supply price also changes.

- Comprehend the application part of concept of demand, supply and elasticity.

- Discuss the government intervention in form of tools like price ceiling or price floors, imposing taxes etc. to reform the economy.

- Explain the determination of pricing of agricultural commodities.

6.1   INTRODUCTION

In the earlier unit, you covered various concepts of demand, supply, its determinants and reasons for shift and increase in demand and supply. In this unit we will understand the application of demand and supply in terms of determination of price, its applicability in market and usage of concepts like elasticity in daily life. This unit will cover the application of demand and supply for controlling the prices by government interventions in form of Price ceiling and floor pricing and imposition of tools like taxes and giving subsidies.

Application part of the demand and supply will also be explored in terms of determination of pricing of agricultural commodities.

6.2   PRICE THEORY IN ACTION

Rise or fall in price is affected to everyone whether he acts like producer or consumer. A consumer is keen to know if the goods and services he wants to purchase have become expensive or cheap and a producer is more concerned about price of products he produces and price of raw material he has used in production. Therefore, many renowned economist including Adam Smith, Marx, Marshall , Joan Robinson, Chamberlin and Hicks have devoted a lot of time in understanding how prices are determined and under what circumstances they are high or low.

While applying the pricing theory, two points to be taken into consideration are the shape of the demand and supply curve and the shift of the demand and supply curve along with the reason for shift and the effect of shift on the price.

In our example (figure 6.1), we take normal good like fresh curd and examine the effect on price and quantity of fresh curd with an increase in consumer income. The supply curve of fresh curd is shown as upward sloping to reflect the effect of diminishing returns and demand curve of the fresh curd is downward sloping reflecting Law of Demand. With increase in income there is rightward shift of the demand curve of fresh milk assuming it is normal good and hence shift results in increase in price and quantity of the product.
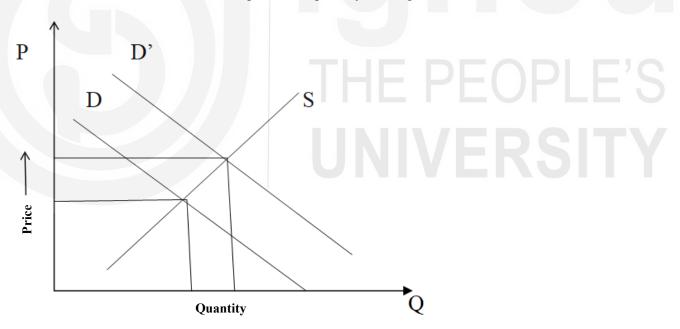

Figure 6. 1 – Shift in the Demand curve

With improvement in the technological capacity for extraction of fresh curd from the fresh milk, the cost of extraction reduces due to which, there is a downward shift in the supply curve. This results in new equilibrium being generated. With this new equilibrium, price falls and quantity increases.
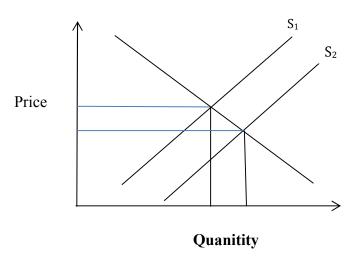
Quanitity

Figure 6.2 : Shift in Supply Curve

The above explanation shows that the shape of the demand and supply curves is helpful in analyzing and determining price and quantity in most of the context. However, it is not always possible that demand curve, sloping downward, relevant to particular situation is always applicable in all situations and similarly supply curve sloping upward is always applicable in all situations. The shape of the demand curve may vary with producer or consumer, region or country wise.

Check your Progress A

State the following statements are **True** or **False**

i.   Shape of demand and supply curve helps in analyzing and determining price and quantity.

ii.   Shape of demand curve always remains the same irrespective of the region or country.

iii. Technological improvements lead to upward shift in the supply curve.

iv.   A consumer is interested to know about the price of the product while producer is concerned about price of raw material.

6.3   APPLYING THE CONCEPTS OF DEMAND, SUPPLY AND ELASTICITY

In the previous units, we understood the concept of demand, supply and method of measuring elasticity and the types of elasticity that exist depending on the change in the determinants. In the coming section we study the application of demand, supply and elasticity in Business Decision making.

For instance, if the cost of production happening in factory is increasing, the production unit would like to pass on the burden of increase in cost on the price of the product so that it doesn't affect their profitability. However, whether the decision taken to pass the cost of production on final consumer proves to be beneficiary or not would depend on the price elasticity of

demand of the product and also price elasticity of demand for its substitutes. In other words, how demand of the product is changing in proportion to change in the price. And also by understanding how increase in price of a product has an effect on increase in demand of its substitutes even if its price has remained unchanged. Rise in the price will be of benefit only if demand of a product is less elastic and demand elasticity of substitutes in much less elastic.

To understand the application of elasticity in real world, we need to study various variables since it involves too many variables and these variables change all the time. Broadly these variables are classified into controllable and uncontrollable. Controllable products are those which are within control of the company like price of product, its advertisement expenditure, services provided and quality of the product offered. While uncontrollable are those which are beyond the control of organization and they can only base on estimates take the decisions. Let us take example of Bike Company. While estimating the demand function of its bike, following determinants of demand are taken into consideration –

- Price of Bike

- Consumer Income

- Price of substitute brands existing in market

- Advertisement expenditure

Out of the above four determinants price of bike and Advertisement expenditure are controllable factors. Suppose company as a policy decision decides to increase the bike price by 10% and advertisement expenditure by 20%. These decisions are made with the assumptions that there is increase in bike user's income by 8% per annum and no change in competitor's price. Therefore, we need to work on finding the price elasticity (Ep), income elasticity (Ey), advertisement elasticity (EA) and cross elasticity (Es) of demand for bike of that company.

The government decision for imposing taxes on products like alcohol, cigarettes and tobacco comes after studying the elasticity of these products. Such addictive products are price inelastic. Same kind of relationship tends to be for essential products. The detailed explanation of this is in next section of Government interferences in form of imposition of taxes.

Elasticity as concept is also applied to understand the effect of increase in price on the revenue. If demand for a good or service is price inelastic, then an increase in price will decrease sales but increase sales revenue. However, a price cut will increase both sales but decrease sales revenue.

Firms like the demand for their product if possible to be inelastic. This means that any increase in price that they put in place will have proportionately less of an effect on demand and their total revenue will rise.

If Ep=1, then revenue will not change even if prices are increased or decreased (Refer to figure 6.3). Here demand curve is rectangular hyperbola and red shaded area is equal to blue shaded area.

If Ep>1. Then increase in price will decrease the total revenue and decrease in price will increase the total revenue (Refer to figure 6.4). Here fall in price from OP1 to OP2, leads to more than proportionate increase in the quantity from OQ1 to OQ2 resulting in rise in total revenue.
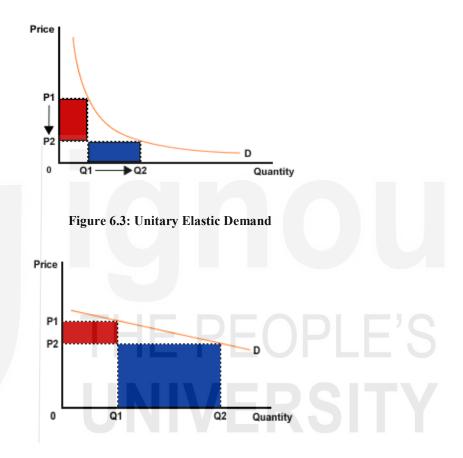
If Ep<1, then increase in the price will increase the total revenue and decrease in price will decrease in total revenue (Refer to figure 6.5). Here fall in the price from OP1 to OP2, leads to less than proportionate increase in demand from OQ1 to OQ2 and hence resulting in fall in total revenue.

Figure 6.3: Unitary Elastic Demand

Figure 6.4 : Elastic Demand
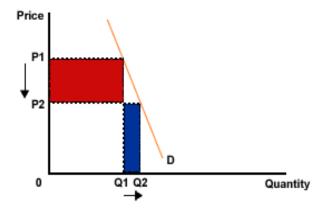
Figure 6.5: Inelastic Demand

Check Your Progress B

Match the item in Column A with those in Column B

Column A	Column B
1. Products which are not within control of the company	a) Controllable Products
2. Price elasticity of tobacco and cigarettes	b) Ep=1
3. Revenue will not change even if prices are increased or decreased	c) Uncontrollable Products
4. Then increase in price will decrease TR and decrease in price will increase TR	d) Price Inelastic
5. Price of the Product	e) Ep>1

6.4 GOVERNMENT INTERVENTION

Market, if left alone, will naturally land up in equilibrium, reflecting equilibrium price where all sellers are willing and able to sell and buyers are willing and able to buy at the price determined by equilibrium. However, this scenario may not hold true in all situations. In case of contemporary mixed economy in particular, government may like to intervene with the market flows by imposing price ceiling and announcing floor price and also using tools like taxes and subsidies to reform the economy of the country.

Government may adopt two means of interfering in the free flow of economy. First, they may set maximum price limit referred to as price ceiling. This is generally applied on basic goods or they may fix lower price referred to as floor price. This is generally applicable in case of agricultural prices to assure minimum return to farmers and hence a step to protect their interest. There have been many discussions and deliberation happening currently on the decision to continue with minimum support price system in case of agricultural goods.

6.4.1 Price ceiling

The maximum price fixed by government beyond which producers cannot charge. Such ceilings are imposed on necessary consumer goods during emergency period like war, in order to prevent them from rising during critical period. The same can be illustrated in form of a diagram (figure 6.6). We have demand curve and supply curve intersecting at point E , resulting in OP as equilibrium price and OQ as equilibrium quantity. Now Government may take a decision to intervene, since they feel that equilibrium price charged is too high. They have fix price ceiling at OP_1 which is less than the equilibrium price determined by market forces. At OP_1, the demand of good is OQ_1 while supply is OQ_2, resulting in shortage of Q_2Q_1.

To tackle situation of shortage, the government may find it necessary to introduce rationing so that the limited goods may be allocated among all the buyers who want them.
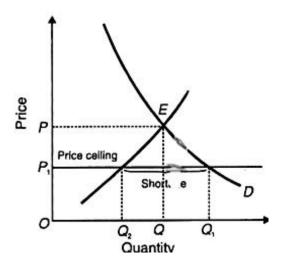

Figure 6. 6: Price Ceiling

6.4.2 Floor Pricing

Unlike price ceiling, floor price are generally introduced to protect interest of the sellers. Generally, the floor price sets the price above the equilibrium price. It has been seen that such tool is used for agricultural goods to support farmers. In situations when market price becomes so low that farmers are not able to protect or maintain their livelihood. The floor pricing is shown in Figure 6.7. In case of floor pricing, the price is fixed higher than the equilibrium price, which results in Supply of the good being higher than the demand. This situation results in surplus, where crops produced by farmers are more than demanded by buyers at that price.
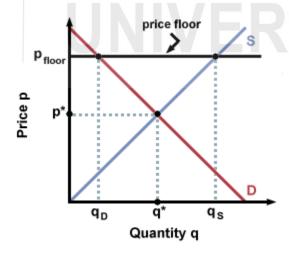

Figure 6.7: Floor Pricing

6.4.3 Imposition Taxes and Subsidies

Next tool for government intervention is imposition of taxes. You might have noticed that in order to discourage the sale of hazardous product like tobacco and cigarettes, government imposes high taxes on such products. However, since the sellers do not want to lose or have reduced profit margins, therefore,

sellers too pass on the added cost on to the buyers. In such cases, the supply curve of the product like tobacco and cigarettes will shift by the amount of tax vertically.

In our example, if government charges Rs10 on every pack of tobacco, and the tobacco seller wants to pass this tax on buyers, then the supply curve will shift upwards and as a result for any price the stores will sell fewer packs of cigarettes, to make up for the extra cost of the tax. Refer to Figure 6.8

In this figure D is demand curve which intersects S, the supply curve, which results in sale of OQ quantity of good at OP price. Let's assume taxes in form of excise duty is imposed (ET) on per unit of good. This leads to upward shift of the supply curve to S_1 and price rises to OP_1

As per the figure 6.8, the RT portion of rise is borne by buyers and the ER portion by the sellers. What portion of incidence of tax would fall on buyer and sellers would be dependent on the elasticity of demand and supply.
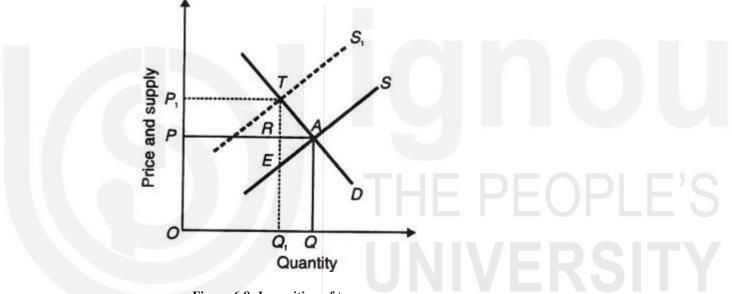

Figure 6.8: Imposition of taxes

Given the elasticity of supply, the greater the elasticity of demand for a commodity, the greater will be the incidence of the tax upon the producers and vice versa. Likewise, given the elasticity of demand, the greater the elasticity of supply, the higher will be the incidence of tax upon the buyers, and vice versa.

Subsidy – Subsidy is the grant given by government to reduce the price per unit of a product. This tool is used in order to encourage the farmers to produce more which may result in fall in price in future. This amount is received as an add on to the market price. The shift in the benefits of the subsidy from producer to buyer depends on the elasticity of demand and supply. Refer to the figure 6.9 below.
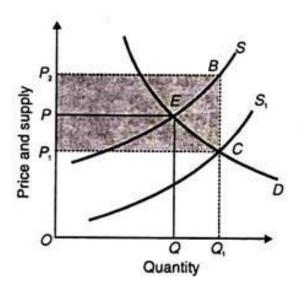
Figure 6.9: Effect of Subsidy

In figure 6.9, demand curve D intersects the supply curve S, resulting in equilibrium E and OP and OQ as equilibrium price and equilibrium quantity respectively. With supply of subsidy, the supply curve shifts towards right. The rightward shift of the supply curve results in fall in the price from OP to OP_1 and rise in quantity from OS to OS_1. The new equilibrium is shown at point C. In the figure, BC refer to the subsidy provided. As a result of the subsidy, the benefits to the consumer are equal to PP_1. Now they can buy more quantity at lower price and the benefits of the produces are shown by P_1P_2.

The subsidy supplied by the government is sum of consumer benefit and producer benefit shown by P_1P_2BC in figure (shaded area).

6.5 PRICING OF AGRICULTURAL COMMODITIES

Pricing of agricultural commodity especially in India is determined primarily by demand and supply interaction. Agricultural commodity market, being very close to perfect competition market, therefore the producer in this market is price taker and no individual farmer can affect its market supply. However, agricultural market is also termed as **"Up and Down Industry"** by famous economist Samuelson, since this kind of industry is faced with many uncertainty and instability. The product being dependent on the fluctuations in the nature, be it situation of drought, rain or good and bad weather conditions.

The determination of agricultural price is where demand (D) and supply (S) curve intersect each other and result in equilibrium point E, with equilibrium price as EP and equilibrium quantity as EQ. This is shown in figure 6.10 below.
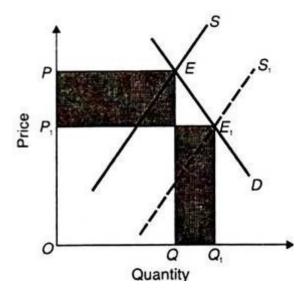
Figure 6.10: Determination of price in agricultural commodity market

With increase in the supply of agricultural commodity, the supply curve shifts towards right from S to S_1 and since demand curve remains the same; the new equilibrium point is attained from E to E_1. Corresponding to new equilibrium point we have new equilibrium price P_1, that is reduced price. At this reduced price, the supply increases to OQ_1. The total revenue of the producer falls from OPEQ to OPE_1Q_1. Refer to Figure 6.10 shaded area.

Agricultural Price Support

As discussed under government intervention section, government specially in developing countries like India provides price support to agricultural producers and at the same time makes sure that the consumer gets agricultural products at reasonable price. This is done by fixing minimum price or floor price.
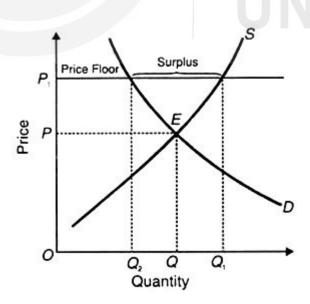

Figure 6.11: Agricultural Support Price

Refer to figure 6.11, reflecting D and S as demand and Supply curve and OP and OQ as equilibrium price and equilibrium quantity respectively. At the

price floor OP$_1$ imposed by government, the producer will be willing to sell OQ$_1$ quantity while demand will fall to OQ$_2$ resulting in Q$_2$Q$_1$ surplus. This surplus is bought by government as buffer stock.

Check your Progress C

1.   State whether the following statements are True or False

   i.   Price Ceiling refers to the maximum price fixed by government beyond which producers cannot charge.

   ii.   Surplus is bought by government as Buffer stocks.

   iii.   Pricing of agricultural commodity especially in India is determined primarily by demand and supply interaction.

   iv.   Agricultural commodity market is close to imperfect competition.

2.   Match the items in Column A with those in Column B

Column A	Column B
1. Price introduced to protect interest of the sellers	a) Equilibrium
2. Intersection of demand and supply	b) Surplus
3. Hazardous Products	c) Floor Price
4. Excess of Supply over Demand	d) Imposition of taxes
5. Agricultural market	e) Up & Down Industry

6.6   LET US SUM UP

In economics, the application part of demand and supply holds a lot of importance. To understand the application of important concepts like demand and supply we need to understand how different shapes of demand and supply curve and shift in the demand and supply curve effects the equilibrium price and quantity. The shift in the demand curve would depend on what kind of product it is (normal good or inferior good) along with other determinants like price of related goods, income level of people, change in taste and preferences etc. Shift in the supply curve would depend on various factors like factors of productions used, technological capacities, goal of firm etc.

Concept of elasticity of demand plays crucial role in business decision making. It helps a manager to understand the quantitative changes in demand due to a given change in variable influencing demand. For example, the decision of raising the price will be correct only if demand for a product is less elastic or demand for its substitute is much less elastic. For understanding, the application of elasticity on business decisions, various

types of elasticity like Income, price, cross and promotional elasticity need to be calculated.

While determining the price, apart from concepts of demand, supply and elasticity, usage of government tools of intervention in form of price ceiling, floor pricing, taxes and subsidies are very critical to understand. Based on the situation, kind of product and need of the hour government makes use of these tools. Generally, price ceiling is to protect the interest of the consumers and floor ceiling is to protect interest of sellers. What portion of incidence of tax would fall on buyer and sellers would be dependent on the elasticity of demand and supply. Another tool subsidy, is the grant given by government to reduce the price per unit of a product. This is basically done with the aim of encouraging farmers for higher production. Many a times usage of these tools are seen while determining the price of agricultural commodity.

6.7   KEYWORDS

Demand: Demands for a commodity refers to the quantity of the commodity which an individual consumer is willing to and able to purchase per unit of time at a particular price

Supply: Supply of a commodity refers to the various quantities of the commodity which a seller is willing and able to sell at different prices, in a given market, at a point of time, other things remaining the same.

Elasticity: Degree of responsiveness of change in dependent variable due to one unit change in independent variable other variables held constant.

Price Elasticity: Degree of responsiveness of change in price of commodity due to change in any of the independent variables.

Taxes: Financial charge imposed or levied by government to collect revenue.

Price ceiling: Maximum amount a seller is allowed to charge.

Floor Pricing: Price fixed to ensure that market price does not fall below a level set. It is in interest of farmers or producers of the commodities.

Equilibrium: State or rest or balance, where demand and supply intersect.

Revenue: Money received, especially on a regular basis, for work or through investments.

Cost of Production: In economics, the cost of production is defined as the expenditures incurred to obtain the factors of production such as labor, land, and capital, that are needed in the production process of a product.

6.8   ANSWERS TO CHECK YOUR PROGRESS

Check you progress A

i.   True ii. False iii. False iv. True

Check you progress B

1) c 2) d 3) b 4) e 5) a

Check you progress C

1. i. True ii. True iii. True iv. False

2. 1) c 2) a 3) d 4) b 5) e

6.9   TERMINAL QUESTIONS

1. Explain the application of elasticity with suitable example in business decision making.

2. How the various tools of government intervention are applied while determining the price?

3. Write short note on-

a. Determination of price in agricultural markets

b. Concept of Surplus and deficit

4. The concept of elasticity is useful in revenue planning. Do you agree with the statement and why.

5. With the help of suitable diagrams illustrate the determination of price and quantity with shift in the demand and supply curve.

> **Note: These questions will help you in understanding the unit better. Try to write their answers. However, do not send them to the University because they are meant for your own practice only.**

UNIT 7 LAW OF DIMINISHING MARGINAL UTILITY AND EQUIMARGINAL UTILITY

Structure

7.0 OBJECTIVES

After studying this unit, you should be able to:

- explain the concept of utility;

- discuss the comparative analysis of total utility, average utility and marginal utility;

- explain the law of diminishing marginal utility and its limitations;

- discuss the marginal utility of money;

- explain the demand for a commodity through diminishing marginal utility;

- analysis and discuss the law of Equimarginal utility and its limitations; and

- explain the concept of consumer surplus and its limitations.

7.1 INTRODUCTION

In the previous units, you have learnt the fundamental problems of economic system, basic economic laws and various forms of economic system. This unit deals with consumer's behaviour and the theory of demand. It lays some of the important theoretical foundations of economic reasoning and areas of investigation. You should note that (i) determination of, and (ii) changes in prices of various commodities are clearly connected with (i) demand for, and (ii) supply of those commodities. In effect, continuous interaction goes on between these three (that is, demand, supply and prices) - a process in which they all influence each other. Economists were always interested in finding out the way prices are determined, and the way they undergo a change. With that objective in view, they normally start with a smaller and simpler question, namely, the (i) determination of, and (ii) changes in the price of a single commodity. Its method of analysis and findings are then extended to cover a wider range of prices.

Now if you look at the price of a single commodity you find that it has two aspects. It is (i) paid by buyers and (ii) received by the sellers. In this Block you would have a close look at the first aspect, namely the behaviour of the buyers.

For this a beginning is made by selecting a single consumption commodity so that it is bought by consumers. (The case of a commodity which is an 'input' for production and is bought by producers is considered at a later stage. For the time being, we shall use the two terms 'consumers' and 'buyers' interchangeably). On theside of its buyers, similarly, the buyer selected for analysis is of the most common variety. That is to say, he is the 'typical' or 'representative of the buyers' in general. This is done so that the findings relating to the behaviour of the "representative' buyer can be extended and applied to the entire body of buyers. Having done so, the economists put some simple but very relevant questions like the following.

Why does a typical buyer buy a commodity? Why is he ready to pay a price for it rather than go without it? How much of this commodity will he buy at different prices? The answers to these questions are collectively known as "demand behaviour" of the typical buyer of the commodity under consideration. You should note that while formulating answers to these questions, the economists take the help of the concept of utility. This is a concept with which you are already familiar to some extent. In this Unit, you would learn a little more about it, and that would help you in understanding the behaviour of a representative buyer and put it in some useful standardized form. For example, you note the fact that on the one hand, a consumer gets some utility from the commodity bought by him and on the other hand, he loses some utility in the form of a price paid for it. Accordingly, you immediately come to the conclusion that a consumer would buy a commodity only so long as the utility paid by him in the form of price is less than (or at the most equal to) the utility of the commodity for him, so, if the price goes up, the quantity of commodity purchased is again reduced. In this manner, once you are able to put the behaviour pattern of a typical consumer in a

standardized form, you can extend it to the entire body of consumers of that commodity. You are then able to describe the manner in which its demand in the entire market shifts as its price changes.

However, before we arrive at important findings regarding the demand for a commodity, let us discuss and clarify some of the fundamentals relating to the concept of utility itself.

7.2   UTILITY

You are already familiar with the elements of this concept. You were told in an earlier unit that utility of a commodity is its want satisfying capacity. This statement, however, needs a good deal of clarification and quantification before it can be put to actual use in Economics. And that would also lead you to a more precise definition of the concept of utility.

Utility of a commodity represents satisfaction which is yet to be realized by its consumer. The satisfaction is only an anticipated one, an expected one. Therefore, there is an element of uncertainty attached to it. It is obvious that satisfaction actually received need not be equal the amount expected from it. In other words, satisfaction and utility is not the same thing. Utility is expected satisfaction and satisfaction is realized utility. But you must note one very important thing. The decision of a consumer to buy (or not to buy) a commodity depends upon its utility and not satisfaction. It is the utility (expected satisfaction) that induces a buyer to pay for it and get it. Of course, a consumer's estimate of utility of a commodity may be influenced by a number of things, such as his own past experience, the experience of other buyers, publicity and other selling tactics adopted by the sellers and so on. But all said and done, it is his estimate of the utility of the commodity which finally determines whether it would be bought or not. The consumer can derive satisfaction only after he actually consumes it; but he has to buy it before consumption.

An important feature of utility of a commodity is the fact that it is not a constant thing. It varies from consumer to consumer and even for the same consumer at different times and under different circumstances. The reasons for this phenomenon are easy to see.
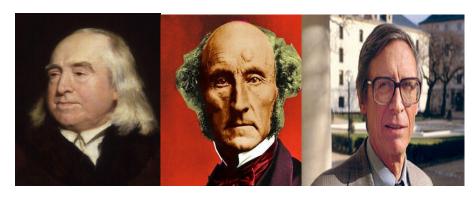
Firstly, utility of a commodity to a consumer depends upon the intensity of the want which would be satisfied with it. It is easy to see that even the same want is not felt with equal intensity by all consumers. For example, every consumer of bread in the morning is not equally hungry.

> **FOR MORE CLARITY!**
> According to utilitarians, such as Jeremy Bentham (1748-1832) and John Stuart Mill (1806-1873), society should aim to maximise the total utility of individuals, aiming for "the greatest happiness for the greatest number of people". Another theory forwarded by **John Rawls** (1921-2002) would have society maximise the utility of the individual initially receiving the minimum amount of utility.

Jeremy Bentham   J.S. Mill   John Rawls

Secondly, utility of a commodity is the assessment of a consumer of the amount of satisfaction he expects to derive from its use. And different consumers are bound to arrive at different estimates. Utility estimated by a consumer depends upon the way he views the circumstances facing him, but there is no standard method of judging a situation and putting it in quantitative terms. Even the same consumer may view a given set of circumstances in various ways. A thirsty person, receiving a cup of water, may additionally believe that he is not going to get another drop of it for the next forty-eight hours or he may be confident that he would be able to get as much of it as he wants. For him, utility of the same cup of water would be more in the former case than in the latter.

Thirdly, it is unlikely that a commodity would be liked equally by all consumers. Other things being equal, the utility of eggs would be more for a person who likes them than for the one who does not. Similarly, utility of a medicine is only for the patient for whom it has been prescribed.

Fourthly, the set of circumstances facing a consumer keep changing. Change of season, place of residence and a lot of other things bring about a shift in the need for a commodity by the consumer causing corresponding change in its utility.

Fifthly, it is a recognized fact that when a commodity is continuously used to satisfy a want the intensity of the latter keeps decreasing. It means that additional units of the good being consumed yield a decreasing amount of satisfaction. Hence, its utility also falls.

Another important feature of the concept of utility relates to its measurement. You are familiar with the units in which length, volume, weight, time and other quantities are measured. As in other sciences, units of measurement have to be selected in measuring the quantities and variables used in economic analysis as well. The concept of utility also throws up the need for measuring it in some standard units. Unfortunately, in reality it is not possible to do so, because utility of a commodity represents a mental assessment, a viewpoint of the consumer regarding the extent of satisfaction that he expects to derive from it. To put it differently, it is not possible to measure utility in absolute or cardinal terms. At the most, a consumer can only tell us which of the two quantities of the same commodity has greater utility for him, or which of the two different commodities A and B or their combination has a greater utility. In other words, the consumer can only rank (arrange) utilities

in their ascending or descending order. This fact is conveyed by saying that utility can be measured only in ordinal terms and not in cardinal ones. This statement has an important implication also. Since you cannot measure, in absolute terms, the utility which a unit of commodity A has for two different consumers X and Y, you cannot say which of the two consumers derives more utility from A. In economic terminology, it is stated that it is not possible to have inter-personal comparisons of utility.

Remember, however, that at this stage of study, it will be necessary for you to assume, for the sake of simplicity of analysis, that utility can be measured in cardinal or absolute terms. Some additional simplifying assumptions including the possibility of inter-personal comparison of utility and the like would also be made by you. In the subsequent unit, however, you would be introduced to ordinal measurement of utility and an analysis of consumer behaviour would be provided on that basis.

The fact that a commodity has utility for a consumer does not mean that it is beneficial or useful for the consumer for that he ought to consume it. A commodity will have utility for the consumer so long as he believes that he can use it for satisfying some want. That way, even harmful things can have utility. Some addictive drugs are considered very harmful for the user's health, but they have a utility for the drug addicts. Smoking may be considered bad for lungs, but so many people are ready to pay for cigarettes. In Economics, therefore, the concept of utility has no ethical implications.

7.3 TOTAL UTILITY, AVERAGE UTILITY AND MARGINAL UTILITY

It would be easier for you to understand these concepts with the help of a numerical example. Suppose that other things being equal, utility derived by a consumer Mr. X, from successive bananas is shown in Table 7.1. You find from the Table, the first banana has a utility of 25 units for our consumer: the second banana has a utility of 18 units and so on. The fifth banana has a utility of only three units. The sixth banana does not bring any utility for the consumer while the seventh banana has a negative utility or disutility of two units. It means that the consumer does not expect to get any satisfaction out of the seventh banana; he thinks that it would cause dissatisfaction to him.

The utility of the last unit of a commodity acquired by a consumer is called its **Marginal Utility (MU).** It means that while finding out MU of a commodity, it is necessary to look at the quantity of the commodity acquired by the consumer. Thus look at Table 7.1 Column 2. If the consumer buys only one banana, then MU is the utility of that banana itself, that is, 25 units. In case the consumer buys two bananas, the MU is the utility of the second banana – in this case 18 units. Similarly, with five bananas, MU of the fifth banana is 3 units, with six bananas -- MU of the sixth banana is zero, and with seven bananas, it is minus two units.(The explanation for MU falling with successive additions of bananas will be found later in this Unit).

Total Utility (TU) represents the sum of utilities of all the units of a commodity acquired by the consumer. In the example provided in Table 7.1, if the consumer gets three bananas, then TU is 25+ 18+12= 55 units. The figures of TU for respective number of bananas can be read from column 4 of Table 7.1. You would note that TU is nothing but sum of successive marginal utilities and MU is nothing but the addition to TU on account of the last unit of the commodity acquired. Therefore, when MU is zero, TU remains unchanged. In our example, TU remains 65 units when sixth banana is added. Also, TU will fall if MU is negative as happens when seventh banana is added.

Table 7.1: Utility of Bananas for the Consumer

	Marginal Utility (MU)	**Average Utility (AU)**	**Total Utility (TU)**
(1)	(2)	(3)	(4)
1st Banana	25	25	25
2ndBanana	18	21.5	43
3rdBanana	12	18.3	55
4thBanana	7	15.5	62
5thBanana	3	13	65
6thBanana	0	10.8	65
7thBanana	-2	9	63

Average Utility (AU) is obtained by dividing total utility by the number of units of the commodity. In table 7.1, figures of average utility are shown in column 3. Remember that, generally, change in average utility is sale for at the most equal to) the change in MU. This happens because the addition to TU caused by MU gets spread over all the units of the commodity when we consider AU.For example, when third banana is acquired by the consumer, 12 falls from 18 to 12 units or a fall of 6 units. However, the AU falls from 21.5 to 18.3 units, or by 3.2 units. Similarly, the reduction in MU is of two units when seventh banana is acquired, but the fall in AU is by 1.8 units only.

You should note that for the first of a commodity, all the three measures of utility are identical in our example, is, 25 units.
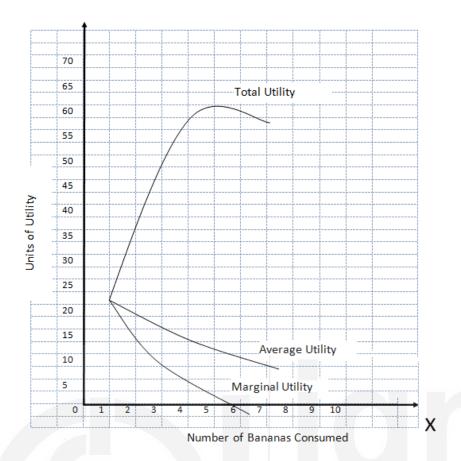
Figure 7.1: Relationship between Total utility, Average utility and Marginal utility

The total, average and marginal utilities of bananas can be represented graphically also. Look at Figure 7.1, Number of bananas is represented along X-axis and units of utility are measured along Y-axis. As expected all the three curves of utility start from the same point. While curves of average and marginal utilities keep falling throughout their length, this is not so with TU curve. It rises so long as MU is positive and MU curve lies above X-axis. When MU cuts X-axis, TU curve stops rising. And when the former goes below X-axis, the latter also starts falling.

Check Your Progress A

1) State whether the following statements are **True** or **False.**

   i)   Utility is the same thing as satisfaction.

   ii) Utility is a subjective thing.

   iii) We can measure utility in absolute terms.

   iv) When a commodity is used continuously for satisfying a want, its marginal utility falls.

   v)   Total utility is the sum total of marginal utilities.

   vi) Marginal utility is the addition to total utility on account of last unit of the commodity.

   vii) If a commodity has utility for a consumer, it must be beneficial for him to consume it.

2) Fill in the blanks out of the words provided.

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i) Decision of a consumer to buy a commodity depends upon its (utility/satisfaction).

ii) Utility is a .... quantity (constant, changing).

iii) Utility is ...... satisfaction: satisfaction is ...... utility. (expected, realized)

iv) Utility can be measured in ....terms only. (cardinal, ordinal)

v) Interpersonal comparison of utility is possible if utility can be measured........... (ordinally, cardinally).

7.4 LAW OF DIMINISHING MARGINAL UTILITY

You are already familiar with an important characteristic of wants, namely, that a given want can be fully satisfied, if the process of its satisfaction is not discontinued in between. As Marshall puts it in his famous book 'Principles of Economics', "There is an endless variety of wants but there is a limit to each separate want." You also remember that utility of a commodity is its want satisfying capacity. Now put these two things together and you get an important law of economics relating to utility. As a consumer gets successive units of a commodity, other things being equal, the intensity of the want being satisfied keeps diminishing. In other words, the satisfaction which can be had by removing the want goes on falling. Each additional unit of the commodity under consideration is expected to yield less satisfaction compared with the satisfaction expected from the preceding unit. That is, marginal utility of the commodity keeps diminishing as the consumer gets additional units of it.

This fact is stated in the form of the Law of Diminishing Marginal Utility or the Law of Satiable Wants. This law says that "the additional or marginal utility which a consumer derives from acquiring one more unit of a commodity, other things being equal, keeps decreasing with every increase in the stock of the commodity which he already has." Note that the fall in marginal utility need not be at a uniform rate. Generally, however, MU would fall very rapidly for the earlier units while it would decrease slowly for the later ones. But this need not always be so. Also note that in some cases, MU may fall to zero or become even negative if the stock of the commodity increases sufficiently. The law of diminishing marginal utility describes a basic fact and a common experience of our daily life. For example, consider the case of a person who is very thirsty and he is given cups of water one by one, to quench his thirst. Clearly, the first cup of water will yield him more satisfaction than does the second; the utility of the second cup will be greater than that of the third; and so on. Eventually, his thirst will be fully quenched and the utility of water will drop to zero. If the consumer is forced to consume one more cup of water, it can even lead to disutility. The example of bananas, presented in the form of Table 7.1 also illustrates this law.

At this stage, consider another fact relevant to the principle of diminishing marginal utility. A particular commodity can be used to satisfy one or more specified wants but not all of them. Had it been possible to use a commodity for satisfying all wants, its MU would have not fallen because human wants are unlimited and keep recurring. Their collective intensity does not fall as more of them are satisfied. It is intensity of one or some given wants that is the use of a commodity. To

> **FOR MORE CLARITY!**
> The law of diminishing marginal utility is at the heart of the explanation of numerous economic phenomena, including time preference and the value of goods.... The law says, first, that the marginal utility of each (homogeneous) unit decreases as the supply of units' increases (and *vice versa);* second, that the marginal utility of a larger-sized unit is greater than the marginal utility of a smaller-sized unit (and *vice versa).* The first law denotes the law of diminishing marginal utility; the second law denotes the law of increasing total utility.

put it differently, a given commodity Obeys the law of diminishing marginal utility because it cannot be perfectly substituted for other commodities (which are needed to satisfy other wants), but the entire income of a person, that is, all the commodities put together, need not obey this law.

Limitations

There are innumerable situations in which the law of dim cannot be applied. The limitations of the law are contained in the violation of the qualifying phrase, "other things being equal" which means that nothing should happen to increase the intensity of wants for the satisfaction of which the commodity under consideration is being used. However, other things need not remain the same, the intensity of the wants in the process of satisfaction may increase and if that happens, the law of diminishing marginal utility will get violated. Thus, the limitations of the law are nothing but the most common causes leading to an increase in the intensity of wants during the process of their satisfaction and thus causing an upward shift in the MU of the commodity. Following are the limitations of this law:

1   **Suitable units:** For the application of the law of diminishing marginal utility, it is necessary that the commodity should be supplied to the consumer in suitable units. Shoes, for example, should be in pairs and not in individual pieces. Wall paper for the house should be enough for at least a particular area to be covered.

> Marshall mentions the case of a short concert or a holiday. Listening to music for a very short period may increase the desire to listen and enjoy it further in which case its MU may go up.

Similarly, a holiday of a very short duration may intensify the desire for it leading to an increase in its MU.

2 **Time-factor:** A want can recur and increase in intensity if passage of time is allowed between consumption of two units of a commodity. A person may get greater utility from the second chapati if it is consumed the next day. Similarly, a second cup of water may yield greater utility if the consumer is forced to become thirstier by delaying its availability.

3 **Tastes, fashion, and income:** Given enough time, these things can undergo a change and, therefore, alter the intensity of the want. However, it is not necessary that these factors would necessarily intensify it; they may even weaken it. It is well known that a change in fashion alters the acceptability of a commodity and thereby it's utility. Some commodities gain in utility because more people want them and in larger quantities. As against this, some commodities go out of fashion and, therefore, lose in utility. In the same way, an individual's tastes (or preferences) can also undergo a change.

A very important factor influencing the utility of a commodity is the income of the consumer. Normally, some commodities are used mainly by the poor such as coarse grains, inexpensive clothes and so on. Accordingly, they are called 'inferior commodities' or 'poor man's commodities'. Any person whose income goes up would like to give up the consumption of such commodities and instead go in for the so called normal or superior commodities. In other words, the very change in income of a person can change the utility of a commodity for him without changing its stock.

4 **Anticipated availability of the commodity:** If the consumer comes to believe, rightly or wrongly, that the availability of the commodity would fall in the forthcoming time interval, its MU would go up.

> For example, if a thirsty person finds, after one cup of water, that he would not get any supply for the next few days, the utility of the second cup for him will immediately go up.

5 **Capacity to enjoy a commodity:** It frequently happens that the capacity of a person to enjoy a particular commodity undergoes a change during its consumption. In that case, the law of diminishing MU may not hold.

> Thus a person, listening to a particular song, may be able to appreciate it better with second/third hearing.

6 **Rare collections:** Some commodities like rare coins, paintings etc., constitute a special category of their own. Their supply is usually of non-identical items and they add to the total enjoyment of the collector more than proportionately. Their increasing stock adds to the sense of enjoyment, social price, knowledge and similar other aspects of the collector's life and thus the principle of diminishing MU lose its relevance in their case.

7   **Change in the availability of related commodities:** Some commodities
    are related to each other. Two specified commodities for example, may
    be jointly needed for the satisfaction of a want. They are known as
    complementary commodities. In that case, availability of one of them is
    useless to the consumer; but its availability raises the utility of the
    complementary commodity. You can think of a large number of cases in
    which the availability of one commodity increases the utility of the other.
    Some examples are of an electric fan and electricity, Box pen and refill,
    cooking fuel and uncooked food and so on.

    As against complementary commodities, some commodities are
    substitutes of each other, that is, they are used for satisfying the same
    want. For example, alternative food items can be used for satisfying
    hunger. When the availability of a commodity increases, the ability of its
    substitutes falls and vice-versa.

8. **Position in relation to other persons:** Man is a social animal.
    Accordingly, his desire to have possessions and to consume various
    commodities and services is greatly influenced by his position in the
    society. Therefore, the utility of a commodity to the person under study
    changes when its availability to other members of society undergoes a
    change.

    You should, however, remember that the limitations of the law of
    diminishing marginal utility, as described above, do not violate its
    fundamental applicability. The law still remains applicable in its
    essentials. These limitations only highlight the fact that very frequently
    the conditions attached to the law are not satisfied and the intensity of the
    want in the process of satisfaction goes up. However, if the assumptions
    of the law hold, the law itself would be a valid one.

7.5   MARGINAL UTILITY OF MONEY

At this stage, we are faced with an important question. Is the law of
diminishing marginal utility applicable to money? Opinions differ as to what
the reality is because of the following reasons.

Money represents purchasing power in general. It is used for buying
everything that is sold in the market. We have seen earlier that while an
individual want can be fully satisfied, all wants put together cannot be.
Therefore, why should MU of money fall when a person has more of it?
Some thinkers, however, do not agree with this reasoning. They appeal to the
general experience of our everyday life and tell us that marginal utility of
money also falls when its quantity increases. We are asked to compare the
indifference with which a person having a large sum of money would not
worry about losing coin. But the same person, when he has a very small
amount of money with him would try to recover it. Similar other examples
are given to show that money is also subject to the universal law of
diminishing MU.

Marshall also believes that the law is applicable to money.
However, when he develops the theory of consumer behaviour
and demand, he assumes that money has a constant MU. This
assumption became necessary because a consumer while

7.6 DIMINISHING MARGINAL UTILITY AND DEMAND FOR A COMMODITY

MU of a commodity is closely related to its demand by the consumer. An important fact of market sales is that a consumer buys all the units of a commodity of the same price. Now as a rational person (you are already familiar with the concept of rationality) the consumer wants to ensure that he does buy an additional unit of a commodity X if the utility paid by him by way of its price is less than the utility derived from its purchase, that is, if the price is less than MU. Also he must not buy that unit if the price is more than MU. If the price and MU are equal, the consumer would be indifferent and he may or may not buy that unit. In other words, the price which the consumer is ready to pay never exceeds the MU of the commodity. Accordingly, if the consumer is to buy more of a commodity, the price he is ready to pay should decrease (since the MU of a commodity falls when more of it is bought). Alternately, one can say, that if the price of a commodity falls, a situation would emerge in which MU of the commodity will exceed its price and the consumer would buy more of it.

Let us take the example of Table 7.1. Column 2 of the Table records the MU of bananas to the consumer. Let us suppose that the price of one banana is 12 units of utility. In that case while the consumer pays for 12 units of utility for the first banana, he gets 25 units of utility from it and thereby gains 13 units of utility. Similarly, the second banana brings him a gain of 18-12=6 units of utility. The utility of the third banana, however, is equal to its price and he may or may not buy it. On the other hand, if the price falls below 12 units of utility but remains above 7 units, the consumer would buy the third banana as well. Similarly, he would decide to buy more bananas if price falls and less of them if price rises.

The general rule is that, given the price of the commodity, the consumer decides to buy that quantity of it which equates its MU with its price.

In our example, it is not always possible for the consumer to exactly equate the two because MU changes by large quantities at a time. But the statement made above remains basically valid, and can be put in the form of what is known as the law of demand. This law says that "the demand for a

commodity (that is the quantity of it purchased during any given period of time) increases with a fall in its price and decreases with a rise in its price."

The preceding discussion needs a modification.

In the market, price of a commodity is quoted, received and paid in units of money and not in units of utility. Every buyer pays the same money price (though when converted into utility, the price paid can differ from buyer to buyer). Therefore, it becomes necessary to express the behaviour of the buyer in money terms. In other words, we must be able to find out the quantity of commodity which the consumer is ready to buy at a given price and the price which he is ready to pay for a given quantity.

> For that purpose, it is assumed that the marginal utility of money remains constant irrespective of the stock of money with the buyer. This enables us to state the price which the consumer is ready to pay for different quantities of the commodity under consideration!

This point will be further clarified if you look at Table 7.1 and assume that each rupee has the same MU, say 10 units, for the consumer. On that basis, the MU of bananas, expressed in rupee terms would be as shown in column 3 of Table 7.2.

Table 7.2 : Marginal Utility of Bananas

No. of Bananas	MU (in Units of Utility) (2)	MU (in Rupees) (3)
1	25	2.50
2	18	1.80
3	12	1.20
4	7	0.70
5	3	0.30
6	0	0.00
7	-2	(-)0.20

Thus, with 1 banana MU is Rs. 2.50; with 2 bananas, it is Rs. 1.80; and so on. It follows, therefore, if bananas are priced at 70p per piece, the consumer is ready to buy 3 bananas and may or may not buy the 4[th]banana. For any price less than 30p, the consumer would buy 5 bananas.

7.6.1   The Concept of a Demand Schedule

A demand schedule presents the behaviour of a consumer in the form of a schedule (or table). It has two columns. In the first column, alternative prices
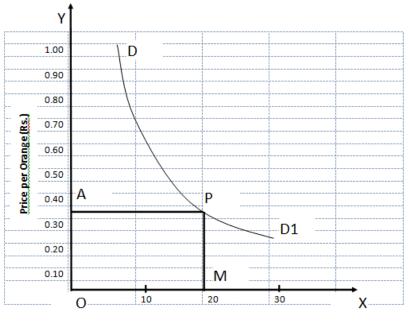
per unit of the commodity under consideration are shown. The second column shows the corresponding quantities of the commodity which the consumer is ready to buy (per period of time) at respective prices. Table 7.3 provides a typical illustration of a demand schedule of oranges by a consumer. Each pair shows the number of oranges which the consumer is ready to buy at a given price or the maximum price which he is ready to pay for a given number of oranges. Thus, for example, when the price is 50p. per orange, the consumer is ready to buy 15 oranges. On the other hand, for buying 15 oranges, he is ready to pay not more than 50p. per orange. Note that a typical demand schedule shows increasing quantities of the commodity with falling price per unit and vice-versa.

Table 7.3: Demand Schedule for Oranges

Price per Unit (in Rs.)	Demand for Oranges (number)
1.00	4
0.90	5
0.80	6
0.70	8
0.60	11
0.50	15
0.40	20
0.30	24
0.20	30

7.6.2 The Concept of a Demand Curve

Demand behaviour of the consumer can also be represented graphically in the form of a demand curve. A demand curve is nothing but a curve obtained by plotting all the pairs of price and quantity demanded. In Figure 7.2 DD is such a demand curve which represents the demand schedule of Table 7.3. Price per orange is measured along Y-axis and the number of oranges demanded along X-axis. If you take any point on the demand curve DD' and draw perpendiculars upon the two axes, then the perpendicular distance of the point from X-axis shows the price for

Figure 7.2: Demand Curve for oranges

orange while its perpendicular distance from Y-axis shows the number of oranges that would be bought at that price. For example, take point P on the demand curve and draw the two perpendiculars PM and PA as shown. Then PM (=OA) price per unit, the number of oranges demanded is given by OM (=AP).

Note that a normal demand curve slopes downwards from left to right because of the fact that quantities of commodity demanded and price per unit move in the opposite directions. For this reason, the demand curve is also said to have a negative slope.

Check Your Progress B

1) State whether the following statements are **True** or **False.**

   i)   No want can ever be satisfied fully.

   ii) Fall in MU of a commodity is always at a uniform rate.

   iii) A commodity can have a negative MU.

   iv) Anticipated availability of a commodity affects its MU.

   v)   Change in tastes, fashion and income of the consumer always increase the MU of a commodity.

   vi) Inferior commodities are health hazards.

   vii) For deriving a demand curve, it is assumed MU of money remains constant.

   viii) A demand curve is a graphic presentation of demand schedule.

2) Fill in the blanks out of the words provided at the end.

   i)   Two commodities are ……………….….... if the availability of one raises the utility of the other.

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ii) Two commodities are .... of each other if the availability of one lowers the utility of the other.

iii) With an increase in the .... the utility of .... commodities to the consumer decreases.

iv) MU curve of a commodity can be used to derive its demand curve if we assume that .... of money remains ....

v) For a given commodity, every buyer pays the same price in terms of .... but not in terms of ....

vi) According to the law of demand, the amount of commodity purchased during a given period of time .... when price and .... when price ....

Words: Constant, MU, utility, rises, falls, substitutes, inferior, superior, complementary, money, decreases, increases, income:

7.7 THE LAW OF EQUIMARGINAL UTILITY

You have seen earlier that a consumer is faced with a large number of wants and all of them cannot be satisfied. The consumer, with his limited income, has to make a choice. He has to decide which wants to satisfy and which ones to leave out. Further it is not necessary that the wants selected for satisfaction must be satisfied fully. Some or all of them may be satisfied only partially. The consumer has to take a decision in this regard also.

How would the consumer proceed? How would he decide as to which wants to satisfy and how much? The answer to these questions lie in the objective with which he decides his consumption expenditure. If he is a rational person, then his objective would be to derive maximum utility from his expenditure. We shall make the assumption that he is a rational person.

You are already familiar with the behaviour pattern of a rational consumer in the context of a single commodity. There, it is assumed that for the consumer, the price of the commodity in question is fixed and he is to decide about the number of units he is to buy. In such a situation, the consumer keeps buying the commodity so long as its MU does not fall below its price.

This method of reasoning needs a modification now. While earlier it was assumed that the consumer buys a commodity, unit by unit, and spends a given amount of money for each unit purchased, now it is assumed that the consumer spends money, rupee by rupee, and gets a given quantity of whichever commodity he buys. Let us suppose that the consumer is to choose between four commodities A, B, C and D where each commodity is subject to the law of diminishing marginal utility. Then while deciding to spend the first rupee, he picks up that commodity which brings him the maximum amount of utility for the rupee spent, and he also makes sure that the MU of money does not exceed that of the commodity bought. Similarly, having spent that first rupee, the consumer finds out which commodity brings him the maximum utility for the second rupee and spends it on that, and so on.

Let us take an illustration and explain it. In Table 7.4, MU schedules of four commodities A, B, C and D are depicted.

Table 7.4 : Marginal Utility Schedules

MU of the Commodities				
Expenditure	A	B	C	D
1st Rupee	30	35	36	26
2nd Rupee	25	28	29	23
3rd Rupee	20	22	19	20
4th Rupee	17	18	10	17
5th Rupee	12	15	5	14
6th Rupee	8	10	2	11
7th Rupee	4	7	0	8

Thus, it is seen that the first rupee spent on A brings in 30 units of utility, the second one brings in 25 units, and so on. The seventh rupee spent on A brings in only 4 units of utility. On the other hand, successive rupees spent on commodity B bring in respectively 35, 28, 22, 18, 15, 10 and 7 units of utility. You can read the meaning of MU figures for commodities C and D also in the same manner.

Let us assume that the consumer is to spend a total of seven rupees on these commodities. On which commodity should he spend the first rupee? Clearly the answer is commodity C, since that way he gets 36 units of utility – the highest possible. Similarly, the second rupee should go to buy the commodity B (35 units of utility), the third rupee should be spent on commodity A (30 units of utility), the fourth rupee again on commodity C (29 units of utility), the fifth rupee on commodity B (28 units of utility), the sixth rupee on commodity D (26 units of utility), and the seventh rupee on commodity A (25 units of utility). If the consumer decides to spend more, then his choice between alternative commodities will follow the same rule. It, of course, should not be forgotten that MU derived from the commodity purchased with the last rupee spend must be equal to or greater than the marginal utility of the rupee spent. Thus the seventh rupee will be spent only if its MU is not more than 25 units.

You can easily extend this illustration by assuming, for example, that the consumer has 12 rupees to spend. You would find in that case that he will spend the 12th rupee of commodity C and three rupees will be spent on each of the four commodities. Similarly the 13th rupee will go to commodity B. But what about 14th rupee? It can go to either commodity A or D. However, if he spends 15 rupees, then both A and D will be bought with 14th and 15th rupees.

Though it is always understood and seldom mentioned, you should not forget an underlying condition in this analysis. The condition is that MU of money does not exceed the MU of the commodity purchased. Thus when the

consumer spends 14 rupees, he gets a MU of 17. Therefore, he would not spend the 14th rupee if MU of money is greater than 17.

The consumer follows the behaviour pattern described above in order to get maximum possible satisfaction. He is obeying what is called the Law of Equimarginal Utility (He is trying to equate MU of different purchases with each other and with that of the money he is spending). This principle is known as the Law of Substitution, the Law of Indifference, the Law of Economy of Expenditure and the Law of Maximum Satisfaction.

The Law of Equi-marginal Utility can also be represented diagrammatically by considering a case of only two commodities (for the sake of simplicity) A and B. In Figure 7.3 MU is measured along Y-axis. The amount of money spent on commodity A is measured along X-axis from the point of origin towards right, and MU, is the corresponding MU curve of commodity A. Similarly, the amount of money spent on commodity B is measured along X-axis from the point of origin towards left and MU, is the corresponding MU curve of B. Then a straight line is drawn parallel to X-axis in such a way that the distance between its points of intersection with MUA and MUR equals the amount of money to be spent. Thus when the consumer spends EF amount of money, GE portion of it is spent on commodity A and FG portion of commodity B. The consumer cannot increase his total satisfaction by shifting his expenditure from one commodity to the other.
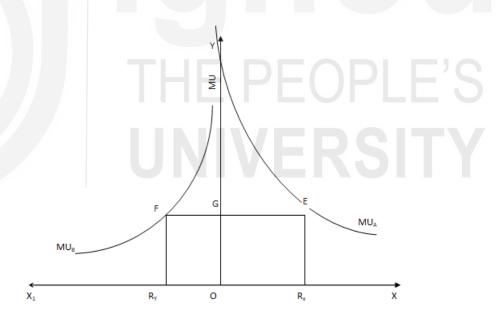

Figure 7.3: law of Equi marginal utility

Normally, the consumer is not able to buy a commodity for a rupee at a time. He has to buy a full unit of it or not at all. And the prices of different commodities also differ from each other. Therefore, in order to arrive at MU per rupee expenditure on a commodity, the utility of the last unit of the commodity purchased (MU of the commodity) is divided by the price of the commodity. In symbols, it would be MU_A / P_A for commodity A, MU_B / P_B for commodity B, and so on. Then, according to the law of Equimarginal Utility, the consumer tries to equate these ratios with each other and also with MU of money. In symbols,

$$\frac{MU_A}{P_A} = \frac{MU_B}{P_B} = \frac{MU_C}{P_C} \dots\dots\dots\dots\dots \text{MU of Money,}$$

Limitations

When it comes to limitations, this law is no exception to the other laws of economics.

1) We have assumed that the consumer is able to spend very small amounts of money on different commodities. This is not always possible. Frequently, you have to buy an item in full either because it is not sold in parts or because it is useless to buy it that way. In other words, many commodities are either technically or for economic reasons not divisible into smaller units. They have to be bought either in bulk or not at all. Accordingly, the amount of expenditure on commodity has to move in large quantities. To put it differently, many purchases are bulky (or in lumpy units) and do not allow small variations. In such cases, the consumer often fails to equate marginal utilities.

2) Ignorance of the consumer poses another problem. A typical consumer is not able to assess and compare variations in marginal utilities of different commodities. Very often the consumer is guided by his habits, past behaviour and behaviour of other consumers, and so on.

3) Another problem arises on account of the life cycle of different consumption commodities that is, the number of times they can be used. Some commodities have only one-cycle use, that is, they are consumed away in one use only. Others have multi-cyclical uses. They are usable many times over. They are referred to as consumer durables. Examples of one-cycle commodities are bread, fuel, electricity, etc. Similarly, examples of multi-cyclical commodities, include cars, scooters, utensils, clothes, shoes, etc. Thus, a problem arises in the sense that while expenditure on a consumer durable is incurred during one period, utility derived from it is spread over many time periods. It becomes very difficult for the consumer to equate the MU of the services rendered by such a variety of commodities and services in each period.

4) Another limitation of this law arises from the fact that many commodities are related to each other. They are either substitutes or complementary. In this law, however, they are assumed to be independent of each other. The utilities derived are assumed to be dependent on their own respective quantities and not on those of others.

5) It is claimed that the consumer hardly tries to compare marginal utilities of different commodities when the amount of expenditure involved is very small. In that context, the law tends to be ignored by the consumer in his behaviour pattern.

6) One should remember, however, that in spite of the limitations described above, the Law of Equimarginal Utility does not lose its fundamental validity. Only its application to reality loses its exactness.

7.8 CONSUMER'S EQUILIBRIUM

With the help of the cardinal utility analysis we will draw the consumer equilibrium. We will begin with one-commodity case and extend it to two or more commodities.

a) One commodity

Suppose, the consumer wants to buy a good. Further, suppose price of good is Rs. 3 per unit. Let the utility be expressed in utils which are measured in rupees. We are given the marginal utility schedule of the consumer.

Table 7.5 Marginal utility of schedule

Quantity	Price (Rs.)	Marginal Utility (Rs.)
1	3	8
2	3	7
3	3	5
4	3	3
5	3	2

When he purchases the first unit, the utility that he gets is 8 utils worth Rs. 8. He has to pay only Rs. 3 for it. Will he buy the 1st Unit? Obviously, yes, because he gets more than what he gives. Similarly, we compare the utility received from other units with the price paid. We find that he will buy 4 Units. At the 4th Unit, MU equals price. If he buys the 5th Unit, he is a looser because the utility that he gets is 2 utils worth Rs. 2 and what he has to pay is Rs. 3. Therefore, the consumer will maximize his satisfaction by buying 4 units of this commodity. The condition for maximization of satisfaction if only one commodity is purchased is:

MU = Price

b) Two commodities

Suppose a consumer consumes only two goods. Let these goods be X and Y. Given income and prices (P_x and P_y), the consumer will get maximum satisfaction by spending his income in such a way that he gets the same utility from the last rupee spent on each good. This is satisfied when:

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} = MU \text{ of a rupee spent on a good}$$

In order to get maximum satisfaction this condition must be satisfied else what difference will it make.

Suppose the two ratios are:

$$\frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}$$

It means that per rupee MUx is higher than per rupee MU_Y. It further means that by transferring one rupee from Y to X, the consumer gains more utility than he loses. This prompts the consumer to transfer some expenditure from Y to X. Buying more of X reduces MUx, Px remaining unchanged. MUx/Px i.e. per rupee MUx, is also reduced. Buying less of Y raises MU_Y. P_Y remaining unchanged it raises per rupee MU_Y. The change continues till per rupee MUx becomes equal to per rupee MUy. In other words:

$$\frac{MU_x}{P_x} = \frac{MU_Y}{P_y} = \text{per rupee MU}$$

BRAIN TEASER

Q.1. An equal proportionate increase in supply and demand will (*i*) leave the equilibrium price unchanged, and (*ii*) increase the equilibrium quantity. Show graphically.
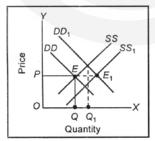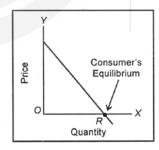
Ans. Fig. 1

Q.2. Show consumer's equilibrium with the help of cardinal analysis, if a consumer has to consume a free good (*i.e.*, a good for which he has not to pay a price)

Ans. Fig. 2

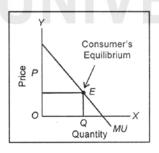**Q.3.** If a consumer has to pay a price for a commodity show his equilibrium situation graphically.

Ans. Fig. 3
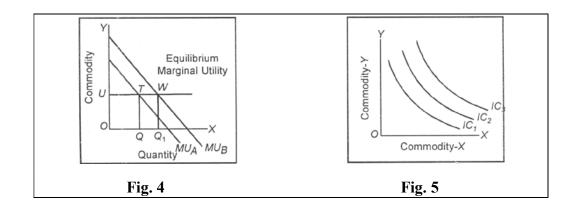

Fig. 1   **Fig. 2**   **Fig. 3**

Q.4. If a consumer has to choose between two commodities, graphically show the determination of consumer's equilibrium.

Ans. Fig. 4

Q.5. Show the consumer's scale of preferences for two commodities, X and Y.

Ans. Fig. 5

Fig. 4

Fig. 5

Q.6. State the consumer's equilibrium in terms of marginal utility of money.

Ans. By marginal utility of money we mean the additional utility that a consumer gets when an additional rupee is spent on other available goods in general.

A consumer would consume a commodity up to the unit where *the difference between the total utility in terms of money and the total expenditure on the commodity is maximum.*

Consumer's equilibrium with respect to the purchase of one good is attained when the difference between total utility in terms of money and the total expenditure on it is maximized. This situation will be attained when the following condition is attained:

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} = MU \text{ of money}$$

If the marginal utility of a rupee increases, consumer's equilibrium will reach at a lower level of consumption. Hence, quantity demanded of the commodity will decrease.

In the given illustration, suppose the marginal utility of a rupee increases to 3. Then, the consumer will be in equilibrium when he consumes only one unit of the commodity.

We can generalize this condition for consumer's equilibrium when two commodities are involved as follows:

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} = MU \text{ of money}$$

Note: There is no defined value of marginal utility of money. It varies from person to person.

7.9 CONSUMER'S SURPLUS

The concept of consumer's surplus was introduced by Marshall. You have seen above that every consumer to buy that quantity of a commodity for which its marginal utility (that is the utility derived from the last unit of the

commodity) and the price get equated. You would remember that every commodity obeys the law of diminishing marginal utility. As more of a commodity is acquired by the consumer, its marginal utility falls. Therefore, while the utility derived from the marginal (or last) unit of a commodity is equal to the price paid for it the utility derived from intra-marginal (or earlier) units is not. It exceeds the price. The inference is that while the consumer pays full for the utility derived from the last unit, the utility derived from earlier units is only partly paid for. The consumer gets the rest of the utility free. Take the example of MU of bananas as depicted in Table 7.2 and let us assume that the price of a banana is 7 units of utility. In that case, we can argue as follows. The consumer is ready to pay a price of 25 units of utility for the first banana rather than go without it. However, he is allowed by the market to have it by paying a price of only 7 units. Thereby he gets 18 units of utility without paying for it. This is his consumer's surplus (measured in utility terms from the first banana. Similarly, the utility derived by the consumer from the second banana is 18 units but the consumer gets it by paying only 7 units. From the second banana, therefore, he gets a consumer's surplus of 11 units of utility. In the same manner, consumer's surplus derived from the third banana is 4 units and no surplus is derived from the fourth banana. Total consumer's surplus derived in this case equals 34 units of utility.

You can see on your own that if the price of a banana is reduced to 3 units of utility, the consumer's surplus goes up. In this case, it is zero from the fifth banana but the earlier bananas yield, respectively, a consumer's surplus of 22, 15, 9 and 4 (or a total of 50) units of utility. In Marshall's words, "The excess of the price which he (the consumer) would be willing to pay rather than go without the thing over that which he actually does pay is the economic measure of this surplus satisfaction. It may be called consumer's surplus."

Thus in brief, the consumer's surplus is the excess of what the consumer is ready to pay for a commodity over what he actually pays for it. The surplus may be measured in terms of utility or in terms of money. In the explanation given earlier, the measurement runs in units of utility. Let us illustrate the concept with the help of a diagram.
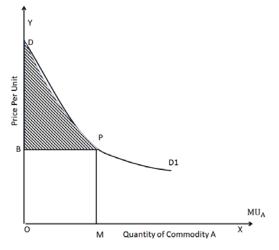

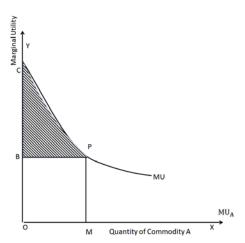**Figure 7.4 : Consumer's Surplus in Money terms**   **Figure 7.5 : Consumer's Surplus in Quantitative terms**

In Figure 7.4, quantity of commodity A is measured along X-axis and its MU is measured along Y-axis. MU, is the marginal utility curve of the commodity A. Let us suppose that its price per unit is equal to OB. In that case the consumer buys OM quantity of the commodity at the price of PM (OB) per unit, and therefore pays a total price equal to OBPM units of utility. The total utility derived, however, is given by the area under MU curve, that is by the area OBCPM. As a result, the shaded area BCP happens to be the consumer's surplus.

The concept of consumer's surplus can be easily expressed in units of money as well. For that both MU of the commodity and its price are stated in money terms. This can be illustrated with the help of a usual demand curve. In Figure 7.5, DD is such a demand curve with quantities of the commodity measured along X-axis and the price per unit along Y-axis. Suppose, the price is OB, OBPM per unit. The consumer then buys OM units of the commodity and pays for each unit at the · rate of PM. In other words, he pays a total price of OBPM amount of money. However, as the demand curve shows, for purchasing OM quantity of the commodity, he is ready to pay a total price of OBDPM rather than go without it. Therefore, his consumer's surplus is OBDPM-OBPM=the shaded area BDP amount of money.

You should note that derivation of consumer's surplus is not due to any wisdom of the consumer. It is the result of market forces which bring him an opportunity to enjoy satisfaction without paying for it. It is related on the one hand, to the demand of the consumer and on the other, to the supply of the commodity on account of which it is available at a given price. Let us elaborate this statement.

1) The demand situation of a commodity by the consumer under consideration determines the location and the slope of the demand curve. In case the commodity is a necessity, the demand curve tends to start from a higher point on Y-axis. It means that for the initial unit (units) of the commodity, the consumer is ready to pay a very high price rather than go without the commodity. You can think of salt and other food items as an examples of such commodities. Similarly, the slope of the demand curve is determined by the quickness with which MU of the commodity falls. If MU falls slowly, demand curve will also fall slowly and the consumer is likely to buy more of it (before MU falls enough to become equal to the price of the commodity). On the other hand, if MU falls rapidly, the demand curve also falls faster. The consumer in this case will buy a smaller quantity of the commodity. It follows that given the price of a commodity, the consumer's surplus be more if:

   i) the demand curve starts a higher initial price which the consumer is ready to pay; and

   ii) the demand curve has a smaller slope.

2) The second set of forces affecting consumer's surplus work on the supply side. In the case of a competitive market (the exact meaning of which you will learn in a later Unit) the consumer is able to buy as much of a commodity as he wants at a given price. The market allows him the

possible consumer's surplus. On the other hand, in a non-competitive situation, the price of a commodity may depend upon the quantity purchased. Here, the consumer may be forced to pay more for the initial units of a commodity. Though the average price paid by him will fall, as be purchases more (and pays less for additional units), his consumer's surplus is not as large as in the case of a fixed price. He may even be forced to pay in such a manner that he is not left with any consumer's surplus at all.

You can extend this reasoning of consumer's surplus to (i) two or more commodities, and (ii) two or more consumers even the whole market. Such an extension is not always easy and can pose many difficulties. Thus, for example, when you consider consumer's surplus from the purchase of two commodities, the total can differ from the sum of the two individual quantities. Can you see why? It is because the commodities may be substitutes or complementaries and not independent of each other. You would remember that when two commodities are not independent (that is when they are related either as substitutes or complementaries) the utility of one is affected by the quantity of the other. Moreover, this influence can be quite strong or very weak depending upon the strength of their relation. Similarly, extension of the analysis to two or more consumers poses some problems which should be kept in mind.

You should note that the concept of consumer's surplus is not just an academic exercise. Though it is difficult to measure it very exactly and though it has many difficulties when we try to extend it to the market as a whole, it has a great practical relevance. For example, the authorities know that necessities bring in larger consumer's surplus. Therefore, they should tax luxuries and comforts and avoid necessities. They should also avoid taxing those commodities on which poor people spend a larger proportion of their budgets. The businessmen, similarly, can charge higher prices for those commodities which have a 'strong' demand that is, for which the buyers are ready to pay more rather than go without.

Check Your Progress C

1) State whether the following statements are **True** or **False.**

   i) Law of Equimarginal utility depicts the behaviour of a rational consumer in maximizing his satisfaction from a given expenditure.

   ii) A consumer always succeeds in applying the Law of Equimarginal Utility in maximizing utility in his consumption decision.

   iii) According to Law of Equimarginal Utility, a consumer always buys the cheaper commodity.

   iv) In the application of the Law of Equimarginal Utility, MU of a

   Commodity purchased can exceed the MU of money.

   v) Different commodities must have identical MU schedules for the Law of Equimarginal Utility to apply.

vi) According to the Law of Equimarginal Utility, a consumer spends equal amounts of money on each commodity.

vii) Lumpy commodities are those which are bought in bigger units.

viii) Consumer's surplus refers to those commodities which the consumer gets without paying for them.

ix) Consumer's surplus emerges because the consumer does not pay a price equal to the utility derived from the purchased commodity.

2) Fill in the blanks:

i) Applicability of the Law of Equimarginal Utility necessitates that the commodities are .... (lumpy/fully divisible)

ii) In the case of related commodities, the Law of Equimarginal Utility loses its .... (validity/exactness)

iii) Consumer's surplus is .... of what the consumer is ………… pay over what he actually pays. (excess/shortfall; forced to/ready to)

iv) Consumer's surplus is the result of ....because of which a consumer can enjoy satisfaction without paying fully for it. (an opportunity/kindness of the seller)

v) There is normally speaking …………of consumer's surplus in necessities than in comforts. (more/less)

7.10 LET US SUM UP

The economists are interested in understanding the determination of and changes in prices in general. But they start with the price of a single commodity and find that its price is determined by an interaction between demand and supply forces.

The analysis of demand side of a single commodity is taken up with the behaviour of a single representative consumer. The consumer buys a commodity and pays a price for it because it has utility for him.

Utility is the expected satisfaction from the commodity. It is an ever changing quantity. It is a subjective thing and cannot be measured in absolute or cardinal terms. It can be measured only ordinally. For this reason, it is also not possible to have interpersonal comparisons of utility. The existence of utility does not imply that the commodity having utility is beneficial to the consumer. It may or may not be so. Utility of a commodity may be viewed in terms of total, average or marginal. Total Utility is the sum of utility derived from all the units of a commodity. Average utility is the total utility divided by the number of units of the commodity while marginal Utility is the utility of the last unit or the addition to total utility on account of the last unit of the commodity. Total utility keeps increasing only so long as marginal utility is positive.

Each commodity is subject to the law of Diminishing Marginal Utility, though in reality the law has many limitations. As far as money is concerned, opinions differas to whether its marginal utility falls with an increase in its

quantity or not. Marshall believed that the law was applicable, though for reasons of analytical simplicity, he assumed that marginal utility of money remained constant.

Changes in marginal utility of a commodity enable us to derive the behaviour pattern of a representative consumer. By assuming that the consumer is a rational person and that marginal utility of money remains constant, it is concluded that he always tries to equate marginal utility of the commodity with its price. This leads us to derive the demand schedule of that commodity which can be represented in the form of a demand curve. The finding can be put in the form of the well-known law of demand which states that the demand for a commodity and its price are inversely related. When one falls, the other increase and vice versa. The demand curve, for this reason, slopes downwards to the right, that is, it has a negative slope.

An extension of the consumer behaviour leads us to the Law of Equimarginal Utility which is also known by other names like the Law of Maximum Satisfaction, the Law of Substitution and the Law the Indifference. This law states that when a consumer is faced with a number of commodities, he divides his total expenditure on them in such a way that the marginal utility derived from each item is equal." For two commodities, the law can also be represented in a graphical form.

The concept of consumer's surplus, introduced by Marshall, explains the fact that a buyer, in general, is ready to pay more for his purchases than he actually does. The excess of what he is ready to pay rather than go without the commodity over what he actually pays, is called the consumer's surplus. It may be expressed and measured in terms of utility or in terms of money. In the former case, use is made of MU curve. In the latter case, the demand curve is used. The amount of consumer's surplus depends upon the position and slope of the demand curve as also upon the supply conditions in the market. Though it is difficult to extend the concept of consumer's surplus to the market as a whole, it has a great practical relevance. For example, the authorities can adjust their tax structure so as to minimize the reduction in it. The sellers, on the other hand, can use the concept for increasing their profits.

7.11 KEY WORDS

Average Utility: It is the total utility divided by number of units of a commodity.

Cardinal Measurement: It is the measurement in absolute terms or numerical units.

Consumer's Surplus: It is that portion of utility derived from a commodity which is obtained in excess of the price paid by the consumer. In money terms, it is the excess of what the consumer is ready to pay for a commodity over what he actually pays.

Demand Curve: Graphic presentation of a demand schedule.

Demand Schedule: The tabular presentation of the amounts of a commodity which will be demanded at different specified prices.

Disutility: This term denotes that the consumption of the commodity under consideration leads to a loss of satisfaction and, therefore, a reduction in total utility.

Inferior Commodities: Those commodities which are believed to be bought by only persons with low incomes. Therefore, the consumer redoes the demand for such commodities when his income increases.

Interpersonal Comparison of Utility: It denotes the comparison of utility derived by two persons. This comparison is possible only under cardinal measurement of utility.

Law of Demand: It is a statement of a tendency that the demand for a commodity falls as its price rises and vice versa.

Lumpy Goods: Those commodities which cannot be purchased in small quantities (that is with a small amount of expenditure), it is also called bulky commodities.

Law of Diminishing Marginal Utility or Law of Satiable Wants: The principle according to which a given want can be satisfied fully and, therefore, the marginal utility of a commodity keeps falling as more of it is acquired.

Law of Equimarginal Utility: This law states that a rational consumer tries to distribute his total expenditure on different commodities in such a way that the marginal utilities derived, per rupee of expenditure from all commodities are equal.

Marginal Utility: It is the utility of the last unit of a commodity; it is addition to total utility on account of the last unit of a commodity.

Negative Slope of a Curve: It denotes the fact that the quantities measured along the two axes are inversely related: when one increases, the other falls.

Ordinal Measurement: The arrangement of utility amounts in ascending or descending order. Here between any two utility amounts, it is known which is more; but it is not known 'how much more'.

Total Utility: It is the sum of utility derived from all the units of a commodity consumed.

Utility: The want-satisfying capacity of a commodity, the expected satisfaction from a commodity.

7.12 ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

1   i) False, ii) True, iii) False, iv) True, v) True, vi) True, vii) False.

1.   i) utility, ii) changing, iii) expected; realized, iv) ordinal, v) cardinally.

Check your progress B

1   i) False, ii) False, iii) True, iv) True, v) False, vi) False, vii) True, viii) True.

2   i) complementary, ii) substitutes, iii) income, inferior, iv) marginal utility; constant, v) money; utility, vi) decreases; increases; falls.

Check your progress C

1 i) True ii) False iii) False iv) True v) False vi) False vii) True, viii) False, ix) True.

2   i) fully divisible, ii) exactness, iii) excess; ready to, iv) an opportunity, v) more.

7.13   TERMINAL QUESTIONS

1)   Distinguish among total utility, average utility and marginal utility.

2)   State the Law of Diminishing Marginal Utility (or the Law of Satiable Wants) and its limitations.

3)   Is the Law of Diminishing Marginal Utility applicable to money? Explain your answer.

4)   Critically examine the Law of Equimarginal Utility.

5)   Discuss the validity of the concept of consumer's surplus in the context of (a) single commodity (b) two or more commodities (c) two or more buyers.

6)   Explain the concept of consumer's surplus. What are its limitations?

> **Note: These questions will help you in understanding the unit better. Try to write their answers. However, do not send them to the University because they are meant for your own practice only.**

UNIT 8   INDIFFERENCE CURVES ANALYSIS

Structure

8.0   OBJECTIVES

After studying this unit, you should be able to:

- outline the shortcomings of Marshallian utility analysis of consumer's demand behaviour;

- explain the concept of a scale of preferences;

- discuss the concept of an indifference curve and its various assumptions;

- enumerate the properties of indifference curves;

- explain the concept of budget price line and its applications;

- explain the meaning and derivation of income consumption curve;

- describe the meaning and derivation of price consumption curve;

- distinguish between income effect, substitution effect and price effect;

- split-up price effect into income and substitution effects;

- derive consumer's demand curve from price consumption curve measure consumer's surplus with the help of indifference curves;

- explain the superiority of otherwise of indifference curves analysis over Marshallian utility analysis.

8.1 INTRODUCTION

In unit 7, you have learnt about the behaviour of a representative rational consumer. The analysis of his behaviour was based upon the concept of utility. With some important assumptions, you were able to put his behaviour pattern in a standardized form. You were able to state that he would reduce his demand for a commodity in response to an increase in its price and would increase the demand if the price was reduced. Similarly, you also learnt that when faced with the problem of distributing his total expenditure over a number of commodities the consumer always tried to ensure that utility received from the last rupee spend on each commodity was equal. His behaviour pattern was put in the form of Law of Equimarginal Utility which, in symbols, states that

$$\frac{MU_x}{P_x} = \frac{MY_Y}{P_Y} = \frac{MU_Z}{P_Z} = \text{................} = \text{marginal utility of money}$$

This analysis of the consumer behaviour enabled you to discover and state the law of demand and helped you in understanding a few related things. But in the process you had to make some assumptions which are highly unrealistic. As a result, findings based upon that utility analysis suffer from three defects:

i)   Since the analysis is based upon unrealistic assumptions, it cannot be claimed that the conclusions of the analysis depict reality. They, at times, can even be misleading.

ii) Utility analysis is not able to cover some important cases such as the relationship between demand and price in the case of 'inferior commodities'.

iii) It is not able to take into account the effect of some important forces on the demand for a commodity.

It was therefore natural for the economists to try and remove the shortcomings of the Marshallian utility analysis and bring out an improved form of analysis. This they did by developing the indifference curves. In this unit you would, learn the concept of indifference curves, their related aspects and their application to consumer's behaviour.

8.2 LIMITATIONS OF UTILITY ANALYSIS

Before taking up indifference curves analysis, you should be able to state the limitations of the utility approach in a systematic manner. Therefore, let us have a brief look at them before going to indifference curves.

i) You are already familiar with the fact that utility is subjective. It cannot be measured in cardinal or absolute terms. It can only be expressed in ordinal terms. However, it is still assumed that utility can be measured cardinally.

ii) Another limitations of utility analysis relates to the assumption that marginal utility of money remains constant. You have noted in unit 7 that from all observations, money obeys the law of diminishing marginal utility. Even Marshall says so. However, when it comes to demand behaviour of a consumer, it has to be assumed that marginal utility of money remains constant.

iii) On account of the assumption of cardinal measurement of utility, the analysis can be extended to state that interpersonal comparisons of utility are also possible. In that case, you are able to say which of the two individuals, for example, A and B, gets more of utility from a given commodity and how much. On scientific grounds, however, interpersonal comparisons of utility are not possible because utility is not measurable in absolute quantities.

iv) Utility analysis of demand cannot explain what is known as Giffin's Paradox. Giffin found that the demand for bread increased with an increase in its price. The explanation of this phenomenon lay in the fact that during Giffin's days in England, workers were very poor, Bread was their basic necessity of life and they had to spend a high proportion of their income on it. With a rise in the price of bread, a poor worker was not left with enough money to buy other articles of food which were considered 'better'and were more expensive. As a result, the poor worker had to reduce his demand for other food articles and instead consume more of bread which was still cheaper compared with them. In the same manner, economists have found that demand for a commodity is affected not only by its current price and marginal utility, but also by expected changes in its price.

v) Marshallian utility analysis is not able to isolate the effect of changes in income of the consumer on the demand for a commodity. The fact is that demand is affected by a number of variables. And change in income is one of them. When the price of a commodity falls (rises) it means that the consumer is able to buy more (less) of other commodities put together.

vi) Another shortcoming of Marshallian utility analysis is that it is not able to cover the case of related commodities that is commodities which are complementary or substitutes.

Indifference curves approach tries to remove some of these shortcomings of Marshallian utility approach while trying to explain the demand behaviour of 'a consumer and deriving the demand curve for a commodity.

Third approach was developed by John R. Hicks and R.G.D Allen

R.G.D.Allen   J.R.Hicks

8.3   A SCALE OF PREFERENCES

This concept is fundamental to indifference curves analysis. Here it is assumed that a consumer is confronted with a number of alternative combinations of commodities, say X and Y. It is further assumed as follows:

i)   The consumer is not able to measure utility or satisfaction in absolute units. Therefore, between any two combinations of commodities X and Y, he is only able to tell us that the utility from the first combination is more than, equal to, or less than the utility from the second combination. He is therefore able to arrange any number of combinations in ascending or descending order of preference. However, he is not in a position to tell as the amount of the difference in the utility from any two combinations.

ii)   The consumer always opts for a combination which is expected to bring him greater total satisfaction. Thus when all possible commodities of commodities under consideration (namely, X and Y) are arranged, we find that the consumer has classified all alternative combinations of commodities to separate groups such that all the combinations within each go represent the same total expected satisfaction. We find further then the groups themselves are arranged in an ascending or a descending order of utility. It is assumed that the consumer, being a rational person, will have a greater satisfaction group to a combination from satisfaction group and that he would have equal preference for that is he would be indifference between) alternative combinations from within the same group. Arrangement of all combinations in this manner is called the consumer's scale of preferences.

You should note the foregoing description of the concept scale of preferences of a consumer is based upon certain conditions or assumptions

i)   While arranging different combinations in order of preferences, the consumer does not think of the cost (or price) of acquiring those commodities. He only thinks of the expected total satisfaction from each combination.

ii)   It is implicitly assumed that the consumer concerned is capable of arranging all the alternative combinations according to their expected satisfaction. That is to say, he can formulate precise estimates of the expected satisfaction from each combination.

iii) The consumer also prefers more satisfaction to the less. That way his behaviour is rational.

iv) There is consistency in the behaviour of the consumer, for example, he prefers combination 1 to combination 2 and combination 2 to combination 3, then he would also prefer combination 1 to combination 3.

8.4   INDIFFERENCE CURVES

An indifference curve is a graphic and simplified way of presenting alternative combinations of commodities which, in the judgement of the consumer, are expected to yield the same total satisfaction. If such combinations are presented in the form of a table, it would be called an Indifference schedule, a graphic presentation thereof is called an Indifference curve. For simplicity and clarity, an indifference curve handles only those cases it each group comprises of only two commodities say X and Y. Let us take an imaginary example of an indifference schedule and its corresponding indifference curve so as to understand the concept more thoroughly.

Table 8.1 Indifference Schedule of a Consumer

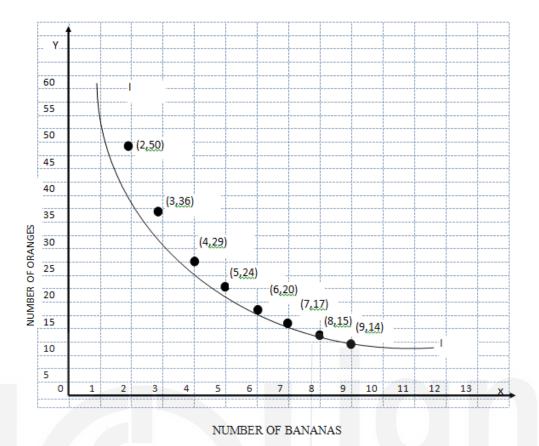| Combination Number	No. of Oranges	No. of Bananas
1	50	2
2	36	3
3	29	4
4	24	5
5	20	6
6	17	7
7	15	8
8	14	9

Figure 8.1 Indifference Curve of the Consumer

According to Table 8.1, the consumer in question hopes to get the same amount of total satisfaction from different combination of oranges and bananas. For example, the satisfaction from a combination of 50 oranges and 2 bananas is the same as that from 36 oranges and 3 bananas or from 29 oranges and 4 bananas and so on. The same combinations are plotted in Figure 8.1 and by joining them we get an indifference curve. You would notice a few features of indifference schedule which shall be explained later in the unit. Thus, you notice that a combination having more bananas has less oranges (or the other way round) is not at a uniform rate. Thus, for each additional banana, the consumer is ready to give up a smaller number of oranges, and similarly for each additional orange, he is ready to give up a smaller quantity of bananas. It is for this reason that indifference curve in Figure 8.1 gets a particular shape which is not only having a negative slope (you are already familiar with the meaning of this term) but is

FOR MORE CLARITY!

A graph of indifference curves for an individual consumer associated with different utility levels is called an indifference map. Points yielding different utility levels are associated with distinct indifference curves and are like a contour line on a topographical map. Each point on the curve represents the same elevation. If you move "off" an indifference curve travelling in a northeast direction (assuming positive marginal utility for the goods), you are essentially climbing amount of utility. The higher you go the greater the level of utility. The non-satiation requirement means that you will never reach the "top" or a "bliss point", *a* consumption bundle that is preferred to all others.

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also convex to the origin, that is, having a curvature towards the origin.

You have seen earlier that a consumer can classify all alternative combinations of commodities X and Y in such a way that each combination in a given group has the same total utility. Acurve representing one such group is an indifference curve. It is clear, therefore, that it is possible to draw a large number of indifference curves such that each curve represents a corresponding group of combinations of X and Y with a given total utility.

A set of indifference curves derived in this manner is called an indifference map, or a system of indifference curves, or a family of indifference curves. You will learn more about an individual indifference curve and the indifference map later in the Unit.

Check Your Progress A

1) Define Indifference Curve

   ……………………………………………………………………………………
   ……………………………………………………………………………………
   ……………………………………………………………………………………
   ……………………………………………………………………………………
   ……………………………………………………………………………………

2) State whether following statements are **True** or **False**

   i) While utility approach to the analysis of consumer's demand behaviour assumes that he behaves rationally, the indifference curves approach does not.

   ii) Utility approach is able to take into account the income effect on demand.

   iii) Giffin's paradox says that people keep buying a commodity even when they do not need it.

   iv) Two commodities X and Y are related only if an increased demand for one is accompanied by an increase in the other.

   v) Inferior commodities are those whose demand falls with an increase in the income of the consumers.

   vi) Marshallian utility analysis is not able to cover the case of related commodities.

   vii) An indifference curve can be drawn on the assumption of cardinal measurement of utility.

3. Fill in the blanks by choosing appropriate words/pharses given in bracket at the end.

   i) An indifference curve represents alternative combinations of commodities X and Y such that total satisfaction from each combination is.................

ii) While arranging different combinations is order of preference, a consumer.................consider the cost of acquiring commodities.

iii) In determining his scale of preferences a consumer classifies all alternative combinations of X and Y into groups such that combinations belonging to a given group have ....

i) A consumer, while comparing expected satisfaction from two alternative combinations of X and Y, is able to say which combination yields more satisfaction but cannot say .... (does not; how much more; the same; the same total satisfaction)

8.5   ASSUMPTIONS OF INDIFFERENCE CURVES

Like any other part of Economics, indifference curve analysis is also based upon certain assumptions which in turn determine their areas of strength, their applicability and their shortcomings.

1   It is assumed that the consumer is to choose between different combinations of only two commodities, namely X and Y. This is a very restrictive assumption because in reality the consumer deals with a large number of commodities. This restrictive assumption is made to facilitate graphic representation of indifference curves. Geometrically, we can have at the most three-dimensional diagrams, though it is far more convenient to work with two dimensions only. The economists realize the shortcomings of having indifference curves with two commodities only. Therefore, they try to overcome this problem by having one of the commodities as the composite commodity, that is a commodity which represents all the other commodities jointly in a definite proportion, or more conveniently, by 'money' which represents alternative combinations of commodity X and money such that the consumer gets the same total satisfaction from each combination.

2   The second assumption of indifference curves approach is that utility can be measured only ordinally. You are already familiar with this concept and, therefore, there is no need to discuss it further.

3   Another important assumption of indifference curves approach is that both commodities X and Y have positive marginal utilities. This implies that given any combination of X and Y, if one of the commodities is increased in quantity, the total satisfaction derived from both commodities put together would increase. Therefore, in order to keep the total utility at the same level, the quantity of the second commodity must be reduced. In other words, with every increase in the quantity of X, there must be a reduction in the quantity of Y; and with every increase in the quantity of Y, there must be a reduction in the quantity of X.

4   It is assumed that both X and Y obey the law of diminishing marginal utility. This is so even when one of the commodities is money. Let us suppose that new combinations are formed by adding one unit of X at a time. Because of diminishing marginal utility, the addition to total utility

would be by decreasing amounts. Therefore, the corresponding reduction in Y should also be by decreasing quantities, that is, the consumer would be ready to give up a decreasing quantity of Y for each additional unit of X. Further, since marginal utility of Y keeps increasing with its falling stock, the consumer would be ready to give up still smaller quantities of Y for each additional unit of X.

2   Both commodities X and Y are perfectly divisible. It means that quantities of both X and Y can be increased (decreased) in minute quantities and the corresponding changes in total satisfaction can also be very small.

8.6   PROPERTIES OF INDIFFERENCE CURVES

Indifference curves have some features (or properties or characteristics) which follow from the assumptions upon which indifference curve approach is based and upon which indifference curves are drawn.

1.   **An indifference curve slopes downwards to the right:** That is to say, an indifference curve has a negative slope. This property shows that any increase in the amount of commodity X is accompanied by a reduction in the quantity of Y. This property is derived from the assumption that both X and Y have positive marginal utility. As a result, when there is an addition to total utility on account of more of X, there has to be an equivalent reduction in total utility through a reduction in the quantity of Y. This is illustrated in Figure8.1.

2.   **An indifference curve is convex to the origin:** It has an inward curvature towards the origin. You can understand this point by remembering the assumption that both X and Y obey the law of diminishing marginal utility.

Now look at Figures 8.2A, 8.2B, and 8.2C. In all the three cases, the indifference curve slopes downwards to the right. In all cases, it has a negative slope. But only Figure 8.2B has an indifference curve which is convex to the origin. In Figure 8.2A. the indifference curve is a straight line so that the reduction in the amount of Y is the same for each additional unit of X. This happens when both X and Y are
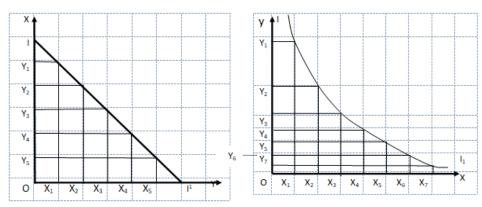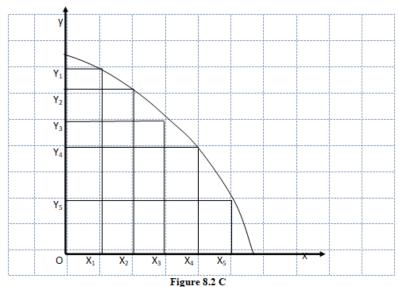

Figure 8.2 A
A Straight Line Indifference Curve

Figure 8.2 B
A Concave to the origin Indifference

Figure 8.2 C
A Curvex to the Origin Indifference Curve

subject to constant marginal utility. In that case, each additional unit of X adds the same amount of utility to the total. Since marginal utility of Y also remains constant, the reduction needed in total utility and therefore the reduction needed in the quantity of Y also remains the same. In Figure 8.2A, the ratios are:

$$\frac{Y_1Y_2}{X_1X_2} = \frac{Y_2Y_2}{X_2X_3} = \frac{Y_3Y_4}{X_3X_4} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$$

As against this, in Figure 8.2B, when quantity of X is increased by one unit at a time the reduction in Y is by ever decreasing quantities (Y_1,Y_2, Y_2, Y_3, Y_3Y_4, ...). This is because of diminishing marginal utility. As the stock of X with the consumer increases, its marginal utility falls and the addition to total utility is by a smaller amount. Consequently, the reduction in Y also takes place in decreasing quantities, all the more so because its marginal utility keeps increasing as its stock with the consumer decreases. In Figure 8.2B, the ratios are:

$$\frac{Y_1Y_2}{X_1X_2} > \frac{Y_2Y_2}{X_2X_3} > \frac{Y_3Y_4}{X_3X_4} > \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$$

You can consider a third case also, that is, in which marginal utility of a commodity keeps, increasing if its stock with the consumer increases. This is a totally invalid assumption. But it is being made here only to explain the type of shape which an indifference curve will get in this case. Here we find that successive additions to X lead to a reduction in Y by increasing amounts. In Figure 8.2C:

$$\frac{Y_1Y_2}{X_1X_2} < \frac{Y_2Y_2}{X_2X_3} < \frac{Y_3Y_4}{X_3X_4} > \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$$

It would be helpful if the above discussion is put in a symbolic form. Let MUX and MU_y respectively denote the marginal utility of X and Y. Then the addition to total utility by a marginal addition of X (denoted by the symbol

ΔX) would be given by the multiplication of MU_x with the quantity by which X changes, that is,

by MU_X. ΔX. Similarly, the reduction in total utility would be given by MU_y.

ΔY. For two combinations to be on the same indifference curve, the addition in total utility should be equal to the reduction in it, that is to say
or

$$MU_X . \Delta X = MU_y . \Delta Y$$

Or
$$\frac{MU_x}{MU_y} = \frac{\Delta Y}{\Delta X} \quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\text{.....(1)}$$

Now look at the equation (1). The value of the ratio ΔY/ΔX shows the amount of Y which the consumer is ready to give up for getting one more unit of X. If MU_x and MU_y do not change when quantities of X and Y change, the ratio ΔY/ΔX does not change. The consumer continues giving up the same quantity of Y for successive additional units of X. Under these conditions, the indifference curve becomes a straight line as in Figure 8.2A. As against this, if both X and Y are subject to diminishing marginal utility, then as the stock of X goes up, MU_X falls and as the stock of Y with the consumer decreases, MU_y increases. This means that the ratio MU_X/MU_Y keeps decreasing. That is, the consumer agrees to give up a decreasing quantity of Y for each additional unit of X. In this case, therefore, the indifference curve is convex to the origin as in Figure 8.2B. If on the other hand, both X and Y are subject to increasing marginal utility, then an increase in the stock of X increases its marginal utility, while a reduction in the stock of Y reduces MU_y. This leads to an increase in the value of the ratio MU_X/MU_y so that the consumer is ready to give up an increasing quantity of Y for each additional unit of X. Such a behaviour of marginal utility leads to the concavity of the indifference curve to the origin, as in Figure 8.2C. You would see that out of the three cases discussed here, the relevant property applicable to an indifference curve is that of convexity to the origin. It is neither a straight line, nor curve to the origin.

3. **No two indifference curves intersect each other:** This property of Indifference curves follows from the assumption that both X and Y have positive marginal utilities. In cases the curves intersect each other, this assumption is violated. The fact of this property can be further explained, with the help of Figure 8.3.
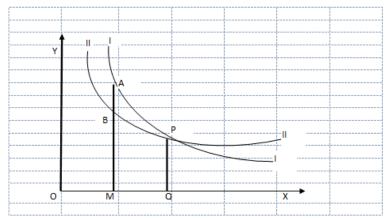
Figure 8.3 : Intersecting Indifference Curve

Let us suppose that two indifference curves I and II intersect each other at point P. Also take a point A on indifference curve I and drop a perpendicular on X axis cutting indifference curve II at point B.

Now both points P and A happen to be on the same indifference curve I, and, therefore, the combinations represented by them have the same total satisfaction.

That is to say OQ of X plus PQ of Y=OM of X plus AM of Y ...(2). Similarly, points P and B are on the same indifference curve II, so that

OQ of X plus PQ of Y=OM of X plus BM of Y......(3) From equations (2) and (3) it follows that OM of X plus AM of Y= OM of X plus BM of Y that is, AM of Y= BM of Y

Now two different quantities AM and BM of Y can yield the same total satisfaction only if the additional amount of Y (AB) has zero utility. This contradicts the assumption that Y has positive marginal utility. In other words, point P cannot be on two different indifference curves and therefore cannot be a point of intersection. Or to put it differently, no two indifference curves can intersect each other.

4   **An indifference curve is a continuous one:** It means that there are no gaps in an indifference curve. This property follows from the assumption that both X and Y are perfectly divisible and their amounts can be varied in very small quantities.

3   **Indifference curves are not parallel to each other:** Though no two indifference curves cut each other, they are not equidistant either. Both the vertical and horizontal distances between two successive indifference curves keep changing as we move along them. This property follows from the assumption that both X and Y obey the law of diminishing marginal utility resulting in convexity of indifference curves.

4   **A higher indifference curve represents greater total satisfaction:** A higher indifference curve is the one which is farther away from the origin. Compared with the curve immediately to the left (and therefore nearer the origin) of it, it has the following feature. Choose a point P on the lower indifference curve
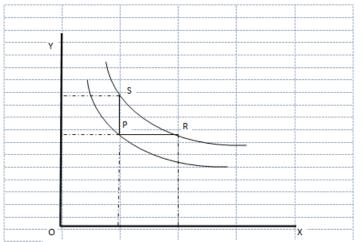
Figure 8.3A: Indifference Curve showing Greater Total Satisfaction

and move horizontally to the right and reach the higher indifference curve at point R. Then both P and R combinations contain equal quantities of commodity Y but combination R contains more of X and, therefore, has greater total satisfaction. Similarly, if you move from P vertically and reach the higher indifference curve at point S, then both combinations P and S contain equal quantities of X but combination S contains more of commodity Y and, therefore, represents greater total satisfaction. Thus it can be seen that the curve farther away from the origin has greater total satisfaction.

8.7   MARGINAL RATE OF SUBSTITUTION

This is a very important concept in indifference curves analysis. Marginal Rate of Substitution (MRS) of X for Y measures the rate at which the consumer is ready to give up Y for an additional unit of X. From an earlier portion of this Unit, you would recall that such a rate is nothing but $\Delta Y/\Delta X$ which is always equal to MU_X/MU_y. In other words, the MRS of X and Y is always equal to the ratio of marginal utility of X to that of Y. Since the two marginal utilities keep changing, therefore, MRS also keeps changing. Note that when we talk of MRS of Y for X (instead of MRS of X for Y) we refer to a situation in which the consumer acquires additional units of Y (instead of X) and gives up corresponding amounts of X (instead of Y). Accordingly MRS of Y for X is equal to $\Delta X/\Delta Y$ and MU_Y/MU_X.

It is important to note that MRS of X for Y keeps falling as the stock of X with the consumer increases because that leads to a fall in MU_x and an increase in MUY and thus a fall in the ratio. Further, geometrically, MRS is represented by the slope of the tangent to the indifference curve at the relevant point of reference. The convexity of the indifference curve and falling MRS of X for Y are thus the same thing. As we move along an indifference curve from left to right (and, therefore, as the amount of X keeps increasing), we find that the slope of the successive tangents drawn keeps falling. This is illustrated in Figure 8.4. MRS of X and Y at point A is given by the slope of tangent drawn to the curve at point A, that is by the ratio OY_1/OX_1. Similarly, MRS of X for Y at point B is given by OY_2/OX_2, which is less than $OY_1/0X_2$. MRS of X for Y at point C is still smaller and is equal to OY_3/OX_3.
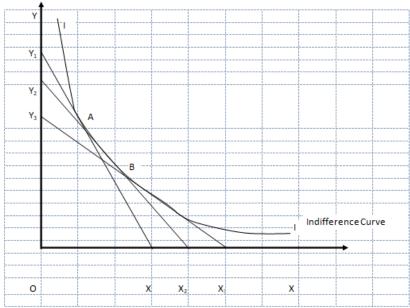
Figure 8.4 : Marginal Rate of Substitution

Table 8.2 :Calculation of MRS

Combination Number	Number of Oranges (Y)	Number of Bananas (X)	ΔY	ΔX	$\Delta Y/\Delta X$	$\Delta X/\Delta Y$
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	50	2	-14	1	-14	-0.07
2	36	3	-7	1	-7	-0.14
3	29	4	-5	1	-5	-0.20
4	24	5	-4	1	-4	-0.25
5	20	6	-3	1	-3	-0.33
6	17	7	-2	1	-2	-0.50
7	15	8	-1	1	-1	-1.00
8	14	9	N.A.	N.A.	N.A.	N.A.

Let us take up the indifference schedule as presented in Table 8.2 and calculate MRS. For this you would need the values of variations in X and Y (that is ΔX and a ΔY) from one combination to the next. Here ΔY represents that quantity of Y which the consumer is ready to give up for a ΔX. Once such an exchange takes place, the value of ΔY which the consumer is ready to give up for ΔX undergoes a change. Thus when the consumer is having combination No. 1 with 50 oranges and 2 bananas, he is ready to give up 14 oranges for one banana. Similarly, when he is having combination No. 3, he is ready to give up only 5 oranges for one banana. These quantities of oranges and bananas that is of ΔY and ΔX are shown in Columns 4 and 5 respectively. The values in column (6) show the ratio ,$\Delta Y/\Delta X$, that is, MRS of X for Y. It is conventional to ignore the negative

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sign of this ratio, so that MRS at this stage is written as 14 and not -14. Similarly, when the consumer has combination No. 2, his MRS of bananas for oranges is 7, and so on for other combinations.

MRS of oranges for bananas is calculated reduction in an addition in the number of oranges and a corresponding reduction in the number of bananas. The ratio in this case is $\Delta X/A\ Y$. The values of successive MRS of oranges for bananas are shown in column 7 of Table 8.2. At combination No. 8, MRS of oranges for bananas is 1/1 or 1; at combination No. 7, it is -1/2 or 0.50; at combination No. 6, it is 1/3 or 0.33 and so on. Here also, you notice that the value of MRS keeps falling as the consumer gets more of oranges and less of bananas. For each additional orange, he is ready to give up a smaller quantity of bananas than before.

Check Your Progress B

1) List the important properties of Indifference Curve.

    …………………………………………………………………………………
    …………………………………………………………………………………
    …………………………………………………………………………………
    …………………………………………………………………………………
    …………………………………………………………………………………

2) What do you mean by Marginal Rate of Substitution?

    …………………………………………………………………………………
    …………………………………………………………………………………
    …………………………………………………………………………………
    …………………………………………………………………………………
    …………………………………………………………………………………

3) State whether the following statements are **True** or **False.**

    i)   Indifference curves approach assumes that while commodity X obeys the law of diminishing marginal utility, money does not.

    ii) In indifference curves analysis, both commodities X and Y are perfectly divisible.

    iii) While drawing an indifference curve, it is assumed that while marginal utility of one commodity is positive, that of the other is negative.

    iv) An indifference curve always slopes downwards, but it can also be concave to the origin.

    ii) Two indifference curves are always parallel to each other.

    iii) Two indifference curves can never intersect each other.

    iv) The convexity of an indifference curve towards the origin and falling MRS are the same thing expressed differently.

v) With a straight line indifference curve MRS keeps falling as we move from left to right.

vi) MRS is equal to the slope of the tangent at the relevant point on the indifference curve.

4) Fill in the blanks with appropriate words/phrases.

i) MRS of X for Y is defined by...............which the consumer is ready to give up, at the margin, for one additional unit of X.

ii) MRS of X for Y falls because both X and Y are subject to......................

iii) The convexity of an indifference curve-follows from the assumption that both commodities are subject to...............

iv) If MRS remains constant, an indifference curve would be a………...

v) We get a continuous indifference curve on the assumption that both commodities X and Y are…………

8.8 CONSUMER'S EQUILIBRIUM

Understanding the determination of consumer's equilibrium is an important necessary step for analysing his behaviour and for deriving his demand curve for a given commodity X. The concept of consumer's equilibrium denotes the position which he tries to attain with given income and given prices, and having attained it, retains it till his income and/or prices change. The consumer's equilibrium position is read as the amount of commodity X which he would buy and the amount of Y (or money) which he would pay for it as its price and, therefore, the amount of Y (or money) which he would retain with him.

Budget Price Line

The concept of budget price line is needed for analysing the consumer's equilibrium and is also variously known as 'price line', 'budget line' or 'budget price line'. We shall use the term budget price line or BPL.

BPL of a consumer shows different combinations of X and Y which the market permits him to have. At the one end, it represents the maximum amount of Y with mo X (point A in Figure 8.5) and at the other end, the maximum amount of X, with no Y (point B in Figure 8.5). The straight line joining these two points (that is the straight line AB) is the BPL and represents all the alternative combinations of X and Y which the consumer can have. He is allowed to have as much of X as he wants (subject to the maximum of OB) by paying its price at the rate of OA OB per unit. For example, in Figure 8.6, if the consumer wants to have OM of X, he is to pay AQ of Y as its price and he is allowed to have the combination of OM of X and OQ of Y. Note that the price per unit of X is the slope of BPL.

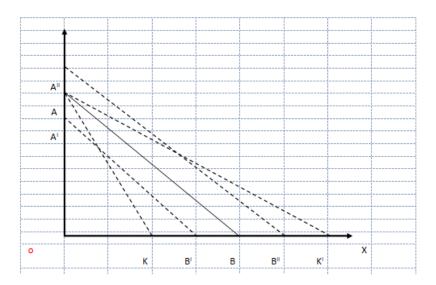In this connection note the following also. If the income of the consumer falls to

Figure 8.5: Budget Price Line

OA, the new BPL becomes A B. However, if the income of the consumer remains the same, but X becomes cheaper, the consumer would be able to buy more of it, say OK' so that the BPL will rotate at its end A and will assume the position AK. Similarly, if the price of X goes up, the consumer will be able to buy less of X, say OK and the BPL would move to the position AK. So you should remember that when income of the consumer changes but price of X does not, new BPL is parallel to the old one and has the same slope. On the other hand, if income of the consumer does not change but the price of X does, then the new BPL will change its slope. It will still start from the same old point A on Y-axis but will touch X-axis at a different point.

You should also remember that a given BPL can be tangent to one and only one indifference curve. Further it either intersects all other indifference curves, or does not touch them at all. Once a BPL intersects an indifference curve, it is bound to intersect it again because the former is a straight line while the latter is convex to the origin. In Figure 8.5, budget price line AB is tangent to indifference curve III. It intersects curves I and II and does not touch curve IV at all. If you try to draw a BPL which is a tangent to two different indifference curves, you would see that this will necessitate intersection of the two curves and you know that no two indifference curves can intersect each other.

You have learnt earlier in this unit that a higher indifference curve represents a greater total satisfaction. Therefore, the consumer, being rational, would try to reach the highest indifference curve which the market allows him to it means which the BPL allows him to). The position of maximum possible satisfaction is given by the point of tangency between BPL and an indifference curve.

Look at Figure 8.6. The BPL of the consumer is AB. The market permits him to have any combination of X and Y represented by a point on AB, C is one such point so that the consumer is allowed to have OM' of X with CM' of Y. But by moving to the right (that is, by increasing amount of X and reducing

that of Y) the consumer can move on to a higher indifference curve. For example, by choosing the combination represented by point D, he can move to indifference curve II. It is easy to see that the consumer should keep moving to the right till he reaches point P and is on indifference curve III. However, he should not move to the right of P (between P and B) because that would again push him to a lower indifference
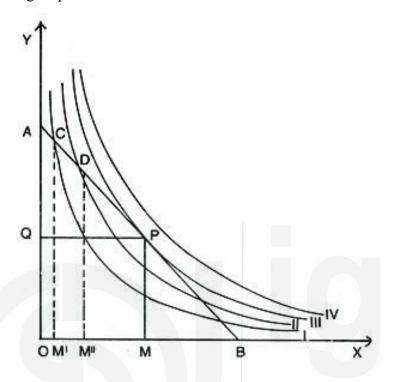

Figure 8.6: Consumer Equilibrium

curve. Note that though the consumer would very much like to move to a still higher indifference curve say No. IV, the market does not permit him to do so. Thus, we see that in equilibrium, the consumer buys OM of X and pays a price AQ for it. He is left with OM of X and PM of Y. At the point of equilibrium, MRS of X for Y and price of X are both equal. To put it differently, the slope of the BPL and that of the indifference curve are equal at the point of equilibrium.
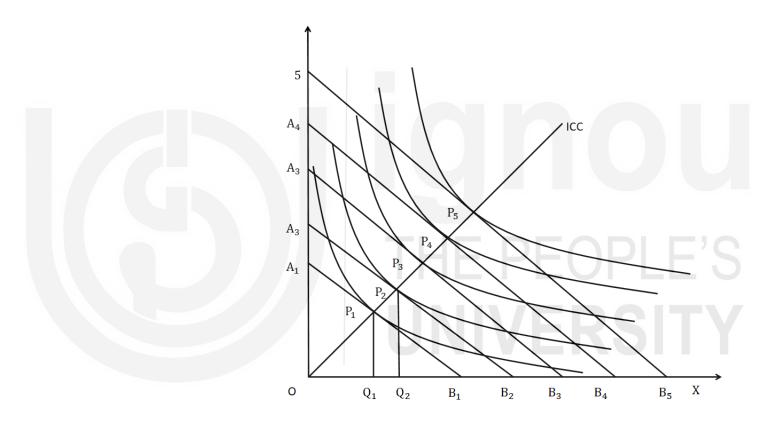
8.9   INCOME CONSUMPTION CURVE

You have seen earlier that with a given price of commodity X, if the income of the consumer changes, the BPL shifts its slope and moves parallel to its original position. As the BPL shifts, every time consumer keeps reaching a new point of equilibrium given by the tangency of BPL with a new indifference curve. The locus of all such points of equilibrium is called the Income Consumption Curve (ICC). Note that ICC starts from the point of origin O. This is an equilibrium position when the income of the consumer is zero so he can have no amount of either X or Y. Further a change in the demand for X resulting from a change in the income of the consumer is called the income effect. A typical ICC is illustrated in Figure 8.7 and is OP_1 P_2 P_3 P_4 P_5 .... As the income of the consumer increases from OA_1 to OA_2......and the BPL shifts from A_1,B_1, to A_2 B_2 ......the equilibrium position shifts from P_1 to P_2 .... Note that when equilibrium shifts from P_1 to P_2, due

to a change in the income of the consumer, he buys OQ_2, instead of OQ_1, of X. The increased demand (Q_1, Q_2) of X is the income effect when the income of the consumer increases from OA_1, to OA_2.

You should remember that ICC may or may not be a straight line. Mostly it will not be a straight line. Another important point to note is that if the commodity X is an inferior commodity, increased income beyond a point would reduce the demand for it.
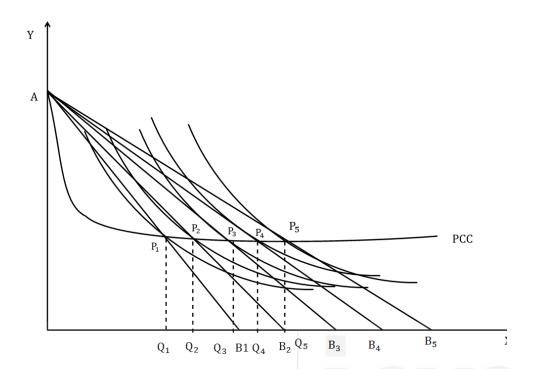
As a result, the ICC would bend towards Y-axis showing that with increased income, the consumer buys less of X. In other words, in the case of inferior commodities, the income effect, beyond a point, is negative. (It is being termed negative because it is opposite of the expected effect).

Figure 8.7 : Income Consumption Curve

8.10   PRICE CONSUMPTION CURVE

Corresponding to the case of a change in the income of the consumer, we have the case of a change in the price of X. Here, as you have seen, with every change in price of X, the BPL changes its slope, but its starting point on Y-axis remains the same. With shifting BPLs, the consumer's equilibrium position also moves and the locus of all such points is called the Price Consumption Curve (or PCC). Figure 8.8 illustrates the construction of PCC. The original income of the consumer is OA with AB_1, as the BPL. The price of X per unit is OA/OB_1, and the equilibrium position is given by the point P_1.

Figure 8.8 : Price consumption Curve

Now suppose the price of X falls so that the consumer is able to buy OB_2, instead of OB_1. The new price of X per unit is then OA/OB, and the new BPL is OB_2 with corresponding equilibrium position at point P_2. And so on for equilibrium point P_3, P_4, etc. By joining these points, you get the PCC, note that this curve starts from point A. The reason is that if price of X rises infinitely high, the consumer will be able to buy almost noting of X even by spending his entire income OA. The BPL would then almost coincide with Y-axis. The consumer in such a case is bound to decide that he would not buy X at such a high price and the equilibrium point would coincide with A.
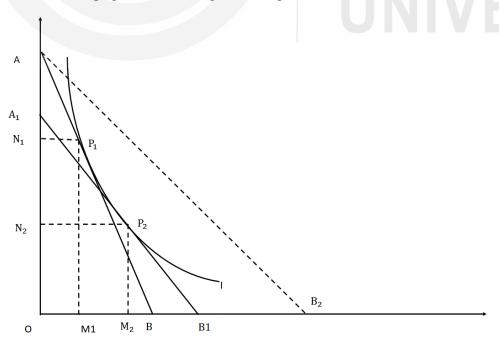

Figure 8.9 :Substitution Effect

This brings us to the concept of substitution effect. The term substitution effect refers to the change in demand for X when income of the consumer does not change but price of X does. This point can be better understood with the help of a diagram. In Figure 8.9 the consumer had AB as his BPL. His equilibrium

position is given by point P_1 which shows that he buys OM_1, of X by paying AN_1, out of his money income as price and retaining ON_1. Absence of a change in his real income is taken to mean that he remains on the same indifference curve even when his equilibrium position changes. In such a case, therefore, when X becomes cheaper, he is able to buy OB_2, provided his money income remains OA. However, the fall in the price of X is accompanied by an equivalent compensatory fall in his money income (from OA to OA) so that the consumer remains on the same indifference curve in his new equilibrium position (P_2). The resulting BPL which is parallel to old BPL is called the compensatory BPL. The amount of X bought, of course, increases from OM_1, to OM_2, and the increase M_1M_2, is called the substitution effect. Note that while the consumer gets an additional quantity of M_1M_2, of X, he loses N_1N_2, amount of Y. You should remember that substitution effect on X is always positive which means that the effect is in the expected direction. In other words, a fall in price adds to the demand for X and a rise in price leads to a fall in its demand.

8.11 SEPARATION OF INCOME AND SUBSTITUTION EFFECTS

A reduction in the price of commodity X means that the consumer can buy more of its without a loss of other commodities. He can but more of commodity X by

spending the same amount of money; or he can buy same amount of X and more of other commodities; or he can buy more of both X and other commodities. In whatever way put, it means that the real income of the consumer goes up and he can move to a higher indifference curve. Similarly, an increase in the price of X means that his real income falls and he moves to a lower indifference curve.

Thus, a fall in the price of commodity X affects its demand for two reasons:

i)   X becomes cheaper compared with other commodities; and

ii) real income of the consumer goes up.

As you saw before, change in the demand of X on account of the first factor is called the substitution effect and the change in its demand on account of the second factor is called the Income Effect. The total change in demand of X is obtained by adding the two changes and is called the Price Effect.

In other words,

Price effect = Income effect ± Substitution effect.

This would be so even when income effect is negative. You would remember that substitution effect is always positive while income effect may be positive or negative depending upon the nature of the commodity under consideration.

How can we split the change in demand for X due to a change in its price (that is the price effect) into income effect and substitution effect components? This can be done by finding out that change in demand which would have been there if the price of X had changed but the real income of the consumer had not. This would give, as you have learnt earlier, the substitution effect. The remaining change in demand of X is then the income effect because in that case the consumer is moving from one indifference curve to the other (without accompanying change in price which has already taken place.) This is illustrated in Figure 8.10.
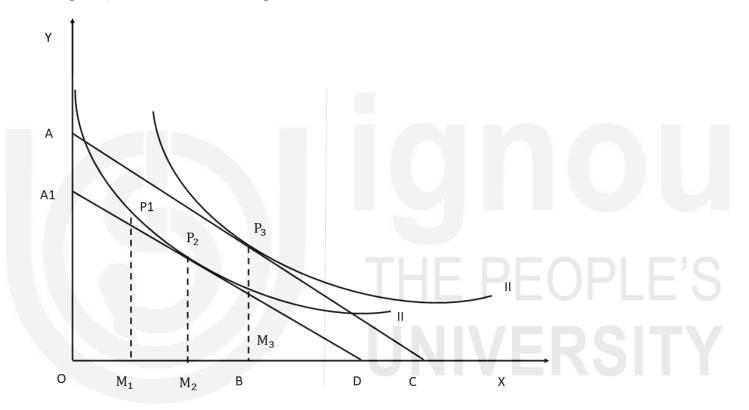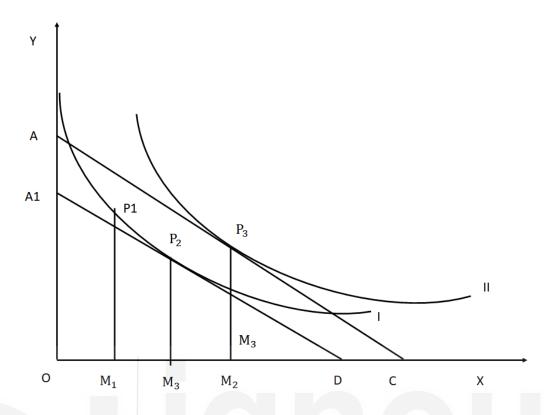

Figure 8.10 : Separation of Price Effect into Income and Substitution Effects

The original equilibrium position of the consumer is given by point P_1. When the price of X falls and the BPL moves from AB to AC, the consumer reaches a new equilibrium position at point P_3. Therefore, the change in demand for X, namely M_1,M_3 is the price effect. Now if the price of X had fallen but with a compensatory reduction in consumer's income, then the new BPL would be A,D and the consumer's equilibrium position would be on the same indifference curve at point P_2, and the resulting increase M_1,M_2, in demand for X would be the substitution effect. Clearly, the remaining change in demand for X_1, namely M_2,M_3 would be the income effect. Remember that it is possible that M_1,M_2, may be equal to M_1,M_3, in which case income effect would be zero. It is also possible that the substitution effect may be greater than M_1,M_3, in which case the income effect would be negative as in Figure 8.11.

Figure 8.11 : Price Effect in Inferior Goods

Check Your Progress C

1) Define consumer's equilibrium.

   ....

   ....

   ....

   ....

   ....

2) What do you mean by Budget Price Line?

   ....

   ....

   ....

   ....

3) State whether the following statements are **True** or **False**:

   i) A budget price line can be tangent to one and only one indifference curve.

   ii) Analysis of consumer's equilibrium shows that he does not necessarily reach the highest possible indifference curve.

   iii) An Income Consumption Curve is always a straight line.

   iv) An Income Consumption Curve always starts from the origin O of the graph.

v) Income effect is the change in demand of a commodity on account of a change in income of the consumer.

vi) Income effect is always positive.

i) Substitution effect can never exceed the price effect.

ii) Substitution effect is always greater than price effect when the commodity under consideration is 'inferior'.

4) Fill in the blanks with appropriate words/phrases.

i) Price consumption curve is a locus of the points of tangency of budget price line with indifference curves when the former shifts on account of changes in ....

ii) Income consumption curve is a locus of points of tangency of budget price line with indifference curves when the former shifts on account of changes in ....

iii) Price consumption curve and budget price line starts from the same point on .... axis.

iv) Substitution effect shows the changes in demand for a commodity when its price changes but there is a .... change in income of the consumer.

8.12 DERIVATION OF CONSUMER'S DEMAND CURVE

In a demand curve price per unit of the commodity is measured along Y-axis and the quantity demanded is measured along X-axis. Price consumption curve can be used to derive a demand curve. In Figure 8.8 when the consumer is at equilibrium point P_1 he demand OQ_1, of X. This way the quantity of X demanded becomes known. For getting, the corresponding price per unit, we use the slope of the budget price line which is OA/OB_1. Similarly, from equilibrium position P_2, the quantity of X demanded is OQ, and the corresponding price per unit is OA/OB. Proceeding in the same manner, the third pair of quantity-price is (OQ_3, OA/OB_2) and the fourth pair is (Od_4, OA/OB_3.). Once all such pairs of quantity-price are estimated, the same can be plotted in the form of a graph and a demand curve can be had by joining them.

8.13 CONSUMER'S SURPLUS

Indifference curves technique can be used for measuring consumer's surplus also. This is done in Figure 8.12. As before, let the consumer have an income OA and let his budget price line be given by AB. The equilibrium position P shows that the consumer buys OM of X_1, pays a price AC for it and retains the balance OC with himself. Now let there be an indifference curve depicting all pairs of X and Y which have the same utility as the pair zero of X plus OA of Y. Such an indifference curve has been labelled 'l' in the Figure. The diagram shows that for the consumer Zero of X plus OA of Y has

the same utility as OM of X plus PM$_1$ of Y. That is to say, the consumer is ready to pay AD for OM of X rather than go without it. But actually he pays only AC. Thus the excess of what he is ready to pay over what he actually pays is given by AD- AC = CD. This is the consumer's surplus measured in money terms (or in terms of commodity Y).
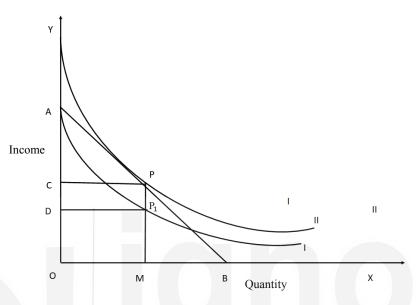

Figure 8.12: C's Surplus

Brain Teasers

Q.1. Show determination of consumer's equilibrium with the help of an indifference map.
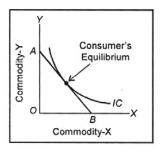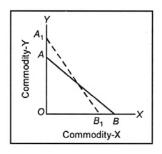
Ans. Fig. 1

Q.2. If the price of Y falls and the price of X rises how will it affect consumer's budget constraint assuming that money income remains unchanged. Show graphically.

Ans. Fig. 2

Q.3. If a consumer's income increases, will it lead to an increase in the level of satisfaction for the consumer? Show graphically.

Ans. Fig. 3. With increase in the level of income, consumer's indifference curve will shift upward showing a higher level of satisfaction.
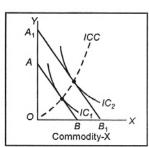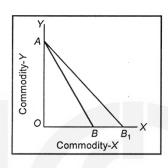

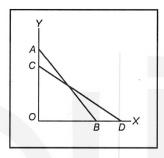| **Fig. 1** | **Fig. 2** | **Fig. 3** |

Q.4. Other things being constant, a fall in the price of X alone will not have any impact on consumer's budget line. Show graphically.

Ans. No, consumer's budget line will change. While the intercept on Y-axis will remain the same, the intercept on X-axis will shift to the right as shown in Fig. 4.

Q.5. If the price of X falls and the price of Y rises, budget line will remain unchanged. Comment graphically.

Ans. No, new budget line will be CD. The original was AB, as shown in Fig. 5

Q.6. How will a simultaneous increase in consumer's income and a fall in the Px impact the budget line?
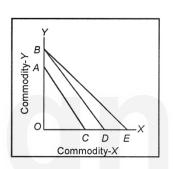
Ans. Fig. 6

| **Fig. 4** | **Fig. 5** | **Fig. 6** |

8.14 SUPERIORITY OF INDIFFERENCE CURVES ANALYSIS

It is often maintained that indifference curves analysis is superior to the utility approach for demand analysis. This, however, is not fully true. The fact is that while indifference curves analysis avoids some unrealistic assumptions of the utility analysis, it carries some weaknesses of its own. You should also remember that both approaches draw upon some common things and are, to that extent, similar to each other. For example, both approaches assume the existence of utility and the application of the law of diminishing marginal utility. The only difference is that in utility analysis, marginal utility of money remains constant (as explained in previous unit) while in indifference curves, the assumption of constant marginal utility of money is abandoned and the analysis is conducted under diminishing marginal utility of money. Similarly, both the approaches assume that the consumer is a rational person. Both of them further assume that the consumer is able to estimate the utility of quantities of commodities over a wide horizon. That is to say, he not only knows the utility expected from the quantity of the commodities immediately available, or nearby quantities, but also of vastly different quantities.

However, indifference curves analysis still claims to be superior to that of utility analysis on the following grounds:

1) While utility approach assumes that utility can be measured in cardinal terms, indifference curves analysis does not.

2) Indifference curves analysis is able to show the effect of changes in income on demand while utility analysis cannot.

3) The assumption of constant marginal utility of money is dropped which makes the indifference curve analysis more realistic.

4) Indifference curves analysis is also able to cover the case of inferior commodities. It is able to account for and explain the fall in demand for a commodity when its price falls or when the income of the consumer goes up.

5) While Marshallian utility analysis assumes that utilities of two different commodities are independent of each other, in indifference curves analysis, this assumption is not needed. The cases of complementary and substitute commodities are fully covered here.

However, the superiority of indifference curves analysis ends here. It retains quite a few shortcomings which make it as unrealistic as the utility analysis, and sometimes even more so.

1) It must be admitted that while utility cannot be measured exactly and in quantitative terms, people do have rough ideas of its relative magnitudes based upon their experience. They do think of a certain quantity of commodity X having say, 50% more of unity than another.

2) The fundamental concept of diminishing marginal rate of substitution is derived from Marshallian concept of diminishing marginal utility.

3) Indifference curves analysis is confined to the case of only two commodities. For covering a larger number of commodities, Y has to be taken as a composite commodity represented by money such that the prices of all the commodities comprising the composite commodity increase or decrease simultaneously and by the same proportion.

4) Indifference curves analysis makes a highly unrealistic assumption that both X and Y are perfectly divisible. In reality, a consumer is faced by lumpy units. As a result, it is not possible to have continuous indifference curves, as also a system of closely placed large number of indifference curves.

5) Indifference curves analysis assumes that the consumer is able to chart out the entire indifference map. This is not possible in practice. A consumer, at the most, can tell about his preferences in the neighbourhood of his existing position.

6) This analysis fails to take into account the fact that the scale of preferences of an individual keeps shifting rapidly. In other words, even if the scale of preferences is chartered out, it needs continuous revision.

7) Indifference curves do not have the additive property when they belong to different individuals. Consequently, it is not possible to arrive at a scale of preferences of the community as a whole. All exercises and conclusions pertaining to the entire economy or at any other aggregative

level are, therefore, based upon the unscientific assumption that preferences can be added up. In that respect, utility approach is better placed because it goes by-a general opinion based upon accumulated experience and observation of people in general.

8) The entire indifference curves analysis is based upon theoretically formulated cause-effect relationships. There is a very little empirical (that is recorded or factual) basis of its exercises. In the same manner, this system of analysis defies collection of relevant data in a usable form.

Check Your Progress D

1) State whether the following statements are **True** or **False**.

   i)   Indifference curves analysis allows us to measure consumer's surplus inmoney terms.

   ii) A consumer gets consumer's surplus only if he moves from one indifferencecurve to the other.

   iii) Price consumption curve is the same thing as the demand curve.

   iv) Consumer's surplus is the amount of money left with the consumer after buying some quantity of X.

   v)   In utility analysis, utilities of two commodities X and Y are always assumed to be independent of each other.

   vi) Scale of preferences of an individual does not shift at all.

2) Fill in the blanks with appropriate words/phrases.

   i)   The .... of budget price line measures the price per unit of the commodity X.

   ii) Utility approach cannot cover the case of commodities, while indifference curves can.

   iii) Indifference curves approach assumes that a consumer is able to chart out his entire …………………..

BRAIN TEASERS

1. A consumer wants to consume two goods. The prices of the two goods are Rs. 4 and Rs. 5 respectively. The consumer's income is Rs. 20.

(*i*) Write down the equation of the budget line.

(*ii*) How much of good 1 can the consumer consume if he spends his entire income on that good?

(*iii*) How much of good 2 can he consume if he spends his entire income on that good?

(*iv*) What is the slope of the budget line?

Ans. (*i*) $4X_1 + 5X_2 = 20$.

(*ii*) Given $P_1 = $ Rs. 4, the consumer can buy $20/4 = 5$ units of good 1.

(*iii*) Given price of good 2 = Rs. 5, he can consume the maximum of 20/5 = 4 units of good 2.

(*iv*) The slope of a budget line measures the amount of change in good 2 required per unit of change in good 1 along the budget line. It is measured as follows:

$$-\frac{P_1}{P_2}.$$

In the given example, P_1 = Rs. 4 and P_2 = Rs. 5. Therefore, the slope of the budget line $= -\frac{4}{5} = -0.8$.

2. How does the budget line change if the consumer's income increases to Rs. 40 but the prices remain unchanged?

Ans. An increase in consumer's income implies that the consumer can purchase increased quantities of both the commodities at the prevailing market prices. As a result, the consumer would be faced with a new budget line. The new budget line will shift rightwards parallel to the original budget line.

In Fig. 1, given *M* = Rs. 20, the budget line formed an intercept at 4 units on Y-axis and 5 units on *X*-axis. With the increase in *M* to Rs. 40, the new intercepts are formed at 8 units on Y-axis and 10 units on X-axis. The new budget line is parallel to the original line.
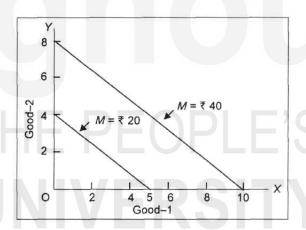
Fig. 1.

3. **What happens to the budget set if both the prices as well as the income double?**

Ans. If, as given,

P_1 changes from Rs. 4 to Rs. 8,

P_2 changes from Rs. 5 to Rs. 10, and

M changes from Rs. 20 to Rs. 40,

then, intercepts on both *X*-axis and Y-axis will remain unchanged at 5 units and 4 units respectively; and the slope of the price line will remain unaffected as

$$\frac{8}{10} = \frac{4}{5}.$$

Therefore, there will be no change in the budget set and the budget line.

4. Suppose a consumer can afford to buy 6 units of good 1 and 8 units of good 2 if he spends his entire income. The prices of the two goods are Rs. 6 and Rs. 8 respectively. How much is the consumer's income?

Ans. We know,

$M = P_1 X_1 + P_2 X_2$

Then, $\qquad\qquad W = 6 \times 6 + 8 \times 8$

$\qquad\qquad = 36 + 64$

$\qquad\qquad = Rs.\ 100$

$\therefore \qquad$ The consumer's income = Rs.100.

8.15 LET US SUM UP

The analysis of consumer behaviour based upon utility approach suffers from some basic shortcomings connected with the unrealistic assumptions upon which it is based. These limitations include measurability of utility in cardinal terms, the assumption of constant marginal utility of money, the possibility of interpersonal comparisons of utility, the inability to explain the demand behaviour for inferior commodities, the income effect and so on. Indifference curves approach tries to remove these defects.

The concept of scale of preference is fundamental to indifference curves approach. It is assumed that a consumer is able to classify all the possible combinations of the two commodities X and Y into groups such that each group contains all those combinations which have the same total satisfaction for the consumer. The consumer is also able to arrange different groups themselves in terms of more or less satisfaction.

An indifference curve is a graphic representation of a group of alternative combinations of commodities X and Y such that each combination is expected to yield the same total satisfaction to him. In a tabular form, the same set of combination is called an indifference schedule. Indifference curves are drawn on the basis of some assumptions, namely, (i) utility can be measured cardinally, (ii) there are only two commodities X and Y, (iii) commodity Y may be a composite commodity or money, (iv) both X and Y have positive marginal utilities, (v) law of diminishing marginal utility applies to both X and Y, (vi) both X and Y are perfectly divisible.

Based upon these assumptions, indifference curves acquire some properties, They are (i) an indifference curve has a negative slope, (ii) it is convex to the origin, (iii) it is continuous one, (iv) two indifference curves cannot intersect each other, (v) we can have a system of large number of indifference curves, (vi) a curve farther away from the origin has higher total utility.

MRS of X for Y is defined as the amount of Y which the consumer is ready to give up, at the margin, for an additional unit of X. It is a ratio AY A X and is also equal to MU_X/MU_y MRS of Y for X is similarly the amount of X which the consumer is ready to give up, at the margin, for an additional unit of Y. It is a ratio A X/ A Y and is also equal to MU_y/MU_X MRS of X for Y keeps falling as the stock of X increases. Similarly, MRS of Y for X keeps falling as stock of Y increases with the consumer.

Budget price line of a consumer is a straight line depicting the alternative combinations of X and Y which the market allows the consumer to have. Its origin at the Y axis is determined by consumer's income in terms of Y and its point of contact with X-axis shows the amount of X which the consumer can buy by spending his entire income. The slope of the budget price line is equal to the price per unit of X. When income of the consumer changes, budget price line moves parallel to its original position and retains its slope. When the price of X changes, the slope of the budget price line changes with the same starting point on Y-axis. When price of X changes with a compensatory change in the income of the consumer, the budget price line shifts both its position and slope.

One budget price line can be tangent to one and only one indifference curve. The point of tangency is also the equilibrium position of the consumer. A locus of all points of tangency when the budget price line shifts on accounts of changes in the price of X is called the price consumption curve. Similarly, the locus of all points of tangency, when budget price line shifts on account of income of the consumer is called the income consumption curve. PCC starts from the starting point of the budget price line on the Y-axis. ICC curve starts from the origin O.

Demand curve for commodity X is not the same thing as the PCC. It can, however, be derived by reading the quantities demanded as shown by PCC and by taking corresponding slopes of the budget price line as the associated per unit prices.

Indifference curves also enable us to measure the consumer's surplus. For that the actual price paid is compared with the price which the consumer is ready to pay rather than go without the commodity. The difference between the two is then the consumer's surplus.

The assumptions and limitations of the utility approach and indifference curves approach can be used to compare the two approaches. It is found that while indifferences curves approach tries to remove a number of shortcomings of the utility analysis, it has a number of shortcomings of its own. An important shortcoming of indifference curves is that this approach is not based upon statistical observations and cannot be used for statistical investigation.

8.16 KEY WORDS

Composite Good (Commodity) is one which conceptually comprises of a number of goods (commodities) (or all goods other than X) such that each

unit of it contains the same quantity of all non-X goods (commodities). Such a composite good is usually represented by money, it being the general purchasing power.

An Indifference Curve: Graphic representation of an indifference schedule.

An Indifference Schedule: It represents, in a tabular form, all the combinations of X and Y which have the same satisfaction.

Budget Price Line (BPL): It is a straight line showing different combinations of commodities X and Y (or of X and money) which the market permits the consumer to have with a given money income and a given price of commodity X.

Consumer's Surplus: The excess of what the consumer is ready to pay for a given quantity of X rather than go without it over what he actually pays.

Compensatory Budget Price Line: The budget price line which is obtained by a reduction in the price of X and a compensatory reduction in the income of the consumer so as to keep him on the same indifference curve.

Giffin's Paradox: It describes the paradoxical situation in which a rise in the price of a commodity leads to an increase in its demand. Income Consumption Curve: It is the locus of all points of tangency of budget price line with indifference curves when the budget price line shifts on account of changes in the income of the consumer.

Income Effect: The change in the demand for a commodity on account of a change in the income of the consumer without any change in the price of the commodity.

Marginal Rate of Substitution: MRS of X for Y is defined as the quantity of Y which the consumer is ready to give up, at the margin, for an additional unit of X. It is a ratio $\Delta Y/\Delta X$ and is also equal to MU_X/MU_y.

Price Consumption Curve: It is the locus of all points of tangency of budget price line with indifference curves when budget price line shifts on account of changes in the price of X.

Price Effect: The change in demand of commodity on account of a change in its price.

Related Goods (Commodities): Those goods (commodities) whose utility and therefore demand are not independent of each other. Such goods may be complementary or substitutes.

Scale of Preference: It refers to the classification of alternative combinations of X and Y into groups such that all combinations belonging to one group have the same total satisfaction, while different groups themselves are also arranged in terms of 'more' or 'less' satisfaction.

Substitution Effect: The change in the demand for a commodity when real income of the consumer remains the same but there is a change in the price of the commodity under consideration.

8.17 ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

2. i) False,   ii) False,   iii) False,   iv) False,   v) True, vi) True, vii) True.

3. i) the same, ii) does not, iii) the same total satisfaction, iv) how much more

Check your progress B

3   i) False,   ii) True,   iii) False,   iv) False,   v) False, vi) True,   vii) True, viii) False,   ix) True.

4   i) the amount of Y, ii) diminishing marginal utility,iii) diminishing marginal utility, iv) straight line, v) perfectly divisible

Check your progress C

3. i) True, ii) False, iii) False, iv) True, v) True, vi) False, vii) False, viii) True.

4   i) price of commodity, ii) income of the consumer, iii) Y, iv) Compensatory.

Check your progress D

1   i) True, ii) False, iii) False, iv) False, v) True, vi) False.

2   i) slope, ii) inferior or related, iii) scale of preferences.

8.18 TERMINAL QUESTIONS

1   What are the assumptions of indifference curves approach?

2   State the properties of indifference curves and derive them from the assumptions upon which indifference curves are drawn.

3. What do you mean by marginal rate of substitution? Why does marginal rate of substitution of X for Y fall when quantity of X is increased?

4   Define the concept of price consumption curve. Where does it start from and why?

5   What do you mean by income consumption curve? Where does it start from and why?

6   Explain the attainment of equilibrium position by a consumer with the help of an indifference curve.

7   Show that a budget price line is tangent to one and only one indifference curve.

8   Diagrammatically explain the concepts of income effect, substitution effect and price effect. Also show the manner in which price effect can be split up into income and substitution effects.

9   Explain the concept of consumer's surplus and show the way it is measured with the help of indifference curves.

10 Write a short note on the claimed superiority of indifference curves analysis over utility analysis.

> **Note: These questions will help you to understand the unit better. Try to write answers for them. But, do not send your answers to the University. These are for your practice only.**

BLOCK 3
THEORY OF PRODUCTION

BLOCK 3   THEORY OF PRODUCTION

In Block 2 you learnt about the consumer behaviour and theory of demand. Production function and law of supply have equal importance in understanding the basic economic laws. In this block comprising of four units, you will learn about the production function, law of supply, elasticity of supply, and theory of costs and cost curves.

Unit 9 deals with the theory of production, law of variable proportions and the law of diminishing marginal returns.

Unit 10 explains the laws of returns to scale, isoquants and isocosts and economies and diseconomies of scale.

Unit 11 deals with theory of costs and various cost curves.

UNIT 9 THE PRODUCTION FUNCTION-I

Structure

9.0 OBJECTIVES

After studying this unit, you should be able to:

- define the production;

- outline the contents of theory of production;

- distinguish the nature of the production function in the short run and in the long run;

- explain the law of variable proportions;

- identify various stages of the law of variable proportions; and

- explain the law of diminishing marginal returns.

9.1 INTRODUCTION

Production is one of the vital processes of any economy. The meaning of the term 'Production and the relationship between inputs and output should be understood by a student of Economic Theory. In this unit, you will learn the contents and relevance of the theory of production and also the production with one variable input. You will also learn the law of variable proportions

and the law of diminishing marginal returns. The concepts of total, average and marginal products will be introduced to explain the law of variable proportions and the law of diminishing returns.

9.2   MEANING OF PRODUCTION

Production can be defined as the creation of different usable goods and services. In other words, production means transforming inputs (labour, machines, raw materials) into output. The process of production does not necessarily involve physical conversion of raw materials into tangible goods. In the process of production an input may be intangible (Service) and an output may be intangible too. Take for example, the production of legal and medical services where both input and output are intangible. Thus production does not only include the creation of material goods but also lawyers, hair-dressers, musicians etc. who are also engaged in productive activity.
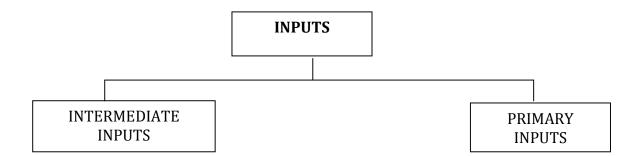
Production process may take a variety of forms. A manufacturing unit buying raw materials to create a semi-finished product is engaged in production. Another factory buying semi-finished product to produce finished product is also involved in production activity. The goods produced in this case are material goods. Transporting a commodity from one place to another is the production of service. A coal dealer does virtually nothing more than transporting coal from coal mines to the market place. Similarly, a fisherman only transports fish to the market place. Their activities too are included in production. Storing a commodity for future sale or consumption is also production. Thus, wholesaling, retailing and packaging are all examples of productive activities. In a broad sense, production can be defined as the creation of utility. The word 'utility' has already been introduced to you in Unit 6.

9.3   THE THEORY OF PRODUCTION

The act of production involves the use of inputs to create outputs. The theory of production begins with specific engineering information. If we have a certain amount of labour, land and other inputs such as machines or raw materials, how much output of a particular commodity can we get? To begin with, we can assume a given state of technology and then find out what will be the maximum obtainable amount of output for any given amount of inputs.

The theory of production consists of laws of production or generalizations regarding relations between inputs and outputs. So, it is the general description of the physical relations between inputs and outputs which forms the subject matter of the theory of production. The word inputs imply all that which goes into the production of material goods or services. Some inputs consist of goods and services currently produced by some other producers of the economy. They are referred to as intermediate inputs. Other inputs consist of what is called **Primary inputs** like land, labour, capital and enterprise. **Primary inputs are also referred to as factors of Production.** Take an example of a carpenter who manufactures chairs. The wood, nails, cane and polish used by him are examples of intermediate inputs, while labour put by

the carpenter, the place of work, instruments employed by him and the initiative taken by him to manufacture chairs are examples of primary inputs.

The Production Function-I

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                          ┌──────────────┐
                          │    INPUTS    │
                          └──────────────┘
                   ┌─────────────┴─────────────┐
        ┌──────────────────┐          ┌──────────────────┐
        │   INTERMEDIATE   │          │     PRIMARY      │
        │     INPUTS       │          │     INPUTS       │
        └──────────────────┘          └──────────────────┘
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9.3.1 Relevance of the Theory of Production

The theory of production has relevance at the micro as well as macro levels. We can list the following four important areas in which the theory of production is relevant.

1) **Price theory:** The theory of production provides a base for the analysis of relation between costs and amounts of output. The prices of inputs influence the costs of production and thus play a part in determining the prices of products. Similarly, the theory of production provides a base for the theory of a firm's demand for factors of production.

2) **Theory of firm:** The theory of production has also a great relevance for the theory of the firm. The theory of the firm is primarily concerned with determining that level of output of a firm which will maximize its total profits. Total profit is the difference between total revenue and total cost. In order to get that level of output at which total profits become maximum, we need to know the concepts of marginal and average costs of production. The changes in marginal and average costs of production as a result of increase in output are determined by the physical between inputs and outputs, besides the prices of factors of production.

3) **Demand for factors of production:** The theory of production explains the forces which determine the marginal productivity of the factors which, in turn, determine demand for them. Demand for a factor of production is one of the important forces determining the price of a factor.

4) **Theory of distribution:** The theory of production is equally relevant to the macro-theory of distribution. It helps us to find out the aggregate distributive shares of the various factors of production. Given the national income of an economy, it is important for us to know the share of wages, profit or rent in national income. These shares can be worked out only when demand for the various factors and their respective prices at which they are hired are known to us.

9.3.2 The Production Function

The tool of analysis which is employed to explain the input-output relationships, implied in the theory of production, is called **Production**

Function. The production function expresses a functional relationship between quantities of inputs and outputs or the production function gives the functional relationship between physical inputs and physical outputs of a producing unit. It specifies the maximum physical quantity of a commodity that can be produced per unit of time with given quantities of inputs and technology. A production function may take the form of a schedule or table, a graphed line or curve, or an algebraic equation. But each of these forms of a production function can be converted into the other forms since they are different ways of expressing this phenomenon. To illustrate the algebraic form of production function, let us assume that a gold mining firm employs only two inputs, capital (K) and labour (L), in its gold production activity. Thus, the general form of its production function can be algebraically expressed as,

$Q = f(K,L)$

Where Q is the quantity of gold production per time unit; K is capital employed per time unit; and Lis labour employed per time unit.

The production function given above implies that Q is the maximum quantity of gold that can be produced with the given volume of capital K and the labour L. Take another example, a firm producing wooden tables, its production function will consist of the maximum number of tables that can be produced from given quantities of various inputs such as wood, varnish, labour time and machine time, etc., that are required to produce tables.

Two things must be noted in respect of the production function.

i) The production function must be considered with reference to a particular period of time. Production function expresses a flow of inputs resulting in a flow of output in a specific period of time.

ii) The production function of a producing unit is determined by the state of technology. When the technology advances, the production function changes with the result that a greater flow of output can be got from the given inputs or smaller quantities of inputs can be used for producing a given flow of output.

9.3.3 Fixed and Variable Inputs

For analysing the process of production, it is important to classify inputs into fixed inputs and variable inputs. A **fixed input**, is defined as one whose quantity cannot be readily changed with changes in output. This situation is given to us because of analytical simplicity and not that any input is ever absolutely fixed. Buildings, machinery and management are some of the examples of inputs that cannot be readily increased or decreased.

A **variable input,** on the other hand, is one whose quantity may be changed simultaneously in response to desired changes in output. The employment of unskilled and semi-skilled labour and the inputs of raw materials are the examples of variable inputs.

For More Clarity!

In microeconomics, the long-run is the conceptual time period in which there are no fixed factors of production as to changing the output level by changing the capital stock or by entering or leaving an industry. The long-run contrasts with the short-run, in which some factors are variable and others are fixed, constraining entry or exist from an industry.

In macroeconomics, the long-run is the period when the general price level, contractual wage rates, and expectations adjust fully to the state of the economy, in contrast to the short-run when these may not fully adjust.

9.3.4 The Short and Long run Period

Corresponding to the distinction between fixed and variable inputs, we have another concept-the short and the long run. The short run is that period of time in which the inputs of some factors of production are fixed while which others are variable. Accordingly, changes in output in the short run are the resultant of changes in the use of variable inputs. For example, if a producing unit wished to expand output in the short run, this normally means using more hours of labour services with the size of plant and equipment remaining unchanged. Similarly, if output in the short run is to be reduced, certain types of workers may be discharged, but we cannot immediately discharge fixed factors like building or machine.

> **SHORT RUN IS A PERIOD OF TIME IN WHICH AT LEAST ONE INPUT IS FIXED, ITS QUANTITY CANNOT BE INCREASED**

The long run is defined as that period of time in which all inputs are taken to be variable. In the long run, output changes can be achieved in the manner most advantageous to the producer. For example, in the short run, a producer may be able to expand output only by operating the existing plant for more hours per day. For this the producer may have to pay overtime rates to workers. In the long run, it may be more economical to install additional productive capacity and return to the normal working day. This distinction between the short run and the long run is of great importance in the theory of production as it gives us the short-run production function and the long run production function respectively.

For example, in the short run, a producer may be able to expand output only by operating the existing plant for more hours per day. For this, the producer may have to pay overtime rates to workers. In the long run, it may be more economical to install additional productive capacity and return to the normal working day.

> **LONG RUN** IS A PERIOD OF TIME IN WHICH QUANTITY USED OF ALL FACTOR INPUTS CAN BE INCREASED.

Check Your Progress A

1) What do you mean by production of tangibles and intangibles?

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   …………………………………………………………………………………
   …………………………………………………………………………………
   …………………………………………………………………………………

2) What are primary inputs?

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   …………………………………………………………………………………
   …………………………………………………………………………………
   …………………………………………………………………………………

3) What is a production function?

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   …………………………………………………………………………………
   …………………………………………………………………………………
   …………………………………………………………………………………

4) Classify the following into fixed and variable inputs.

	Input	Classification		
i)	Raw material	--	--	--
ii)	Skilled labour	--	--	--
iii)	Factory office	--	--	--
iv)	Management	--	--	--
v)	Machines			
vi)	Supervisory staff	--	--	--
vii)	Unskilled labour	--	--	--
viii)	Tools	--	--	--

5) State whether the following statements are **True** or **False.**

i) Production consists of tangible goods alone.

ii) Production of semi-finished products is production.

iii) Production consists of only those goods and services which are exchanged in the market.

iv) A firm require only land, labour capital to produce a flow of goods.

v) The distinction between fixed and variable inputs is relevant only in the long run.

vi) Production undertaken by a firm over one week is termed as short run.

vii) Production undertaken by a firm over one month is termed as long run.

viii) The proportion in which inputs are employed by a firm remain fixed in the short run.

9.4 THE LAW OF VARIABLE PROPORTIONS

Fixed proportions production implies that there is one ratio of inputs that can be used to produce a level of output. If output is increased, all inputs must be increased such that the fixed input ratio is maintained.

When a fixed amount of one input or more than one input is combined with a variable amount of a variable input or inputs, we get a situation of variable proportions. Take for example a farmer who produces say 200 Kg of wheat on a given size of land say one hectare by employing 2 labourers who plough the land with the help of a tractor. If size of land continues to be one hectare and one tractor continues to be employed but this time not 2 labourers but say 3 labourers are employed, then total production may go up to say 300 Kg of wheat. What has happened is that in the first situation the ratio of labourers (variable input) to land and tractors (fixed inputs) is 2:1 and the output of wheat 200 Kg. In the second case ratio of labourers (variable input) to land and tractor (fixed inputs) has increased to 3:1 and the output of wheat has increased to 300 Kg. Thus, as variable inputs are combined with fixed inputs a certain pattern is observed in total production which is referred to as the **Law of variable proportions**. The basic concern of this law is to explain how output change, if the number of units of a variable input is increased, keeping other inputs constant or fixed.

9.4.1 Fixed and Variable Proportions

Fixed production implies that there is one ratio of inputs that can be used to produce a level of output. If output is increased, all inputs must be increased such that the fixed input ratio is maintained. For example, if four labourers and one machine produce 100 units of a commodity and if 200 units are to be produced, then for fixed proportions production labourer machine ratio continues to be 4:1. At first glance fixed proportions production might seem the usual condition but in reality examples of such proportions are hard to

come by Production under conditions of variable proportions is typical of both the short and long run. The proportions are certainly variable in the long run. In the short run, there may be some cases in which output is subject to fixed proportions like one person and shovel produce a ditch and adding one more shovel but keeping one person will not add to total output. Even in the short run there are some cases of variable proportions production.

THINK AND DO
BELOW ARE GIVEN TWO TABLES,
A AND B WHICH OF THESE
REPRESENTS VARIABLE
PROPORTIONS

TABLE A			TABLE B		
X-INPUT		Y-INPUT	X-INPUT		Y-INPUT
2	+	1	2	+	1
2	+	2	4	+	2
2	+	3	6	+	3

As factor proportions change with increase in the quantity of factor-inputs, how does the quantity of total output respond? The answer is provided by the Law of variable proportions.

The basic concern of the Law of Variable Proportions is to explain how output changes if the number of units of a variable input is increased, keeping other inputs constant or fixed.

9.4.2 Statement of the Law of Variable Proportions

The law of variable proportions sets in when the proportion between fixed and variable inputs is altered. According to this law **as the quantity of a variable input is increased by an equal amount, keeping the quantities of other inputs constant, total output will increase, but after a point, at a diminishing rate.** This law can also be put differently. When more and more units of the variable factor are used, holding the quantities of fixed factors constant, a point is reached beyond which the marginal product, then the average and finally the total product will diminish. For understanding the law of variable proportions, first you should clearly understand the concepts of total, average and marginal products.

9.4.3 Total, Average and Marginal Product

The student should be absolutely clear about the concepts of total, average and marginal products before analysing the law of variable proportions. Let us take an example of a farmer cultivating four hectares of land with a tractor and varying the number of workers and let us analyze the level of production of wheat in physical units say in tons.

Table 9.1: Output of Wheat in tons on Four Hectares of Land

Number of Labourers	Total Output (tons)
1	10
2	24
3	39
4	52
5	61
6	66
7	66
8	64

In Table 9.1 you can see how the total output of wheat changes by employing different number of labourers working with same size of land namely four hectares. As the number of labourers keep increasing, total production goes on rising until it becomes maximum of 66 tons when six labourers are employed and the employment of 7th labourer does not add to total production. If we insist on employing eight labourers total production falls to 64 tons.
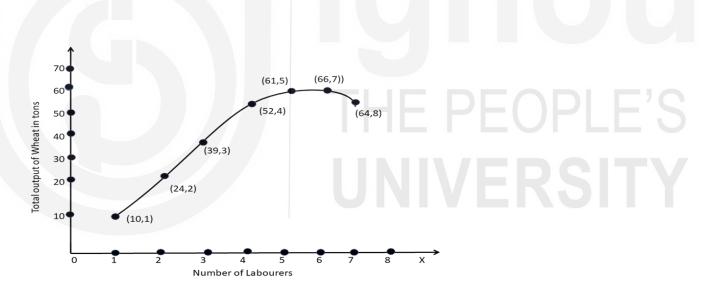

Figure 9.1 : Graphical Representation of wheat in tons on Four Hectares of Land

The information given in Table 9.1 has been represented in Figure 9.1 where on x axis we represent the number of labourers and on y-axis total output of wheat in tons is represented. The level of output produced by a different number of labourers is represented by a curve. The digits on the line represent level of output achieved by different number of labourers. For instance, (10,1) means that 10 tons of output is produced by 1 labourer and similarly (24,2) means that 24 tons of output is produced by 2 labourers and so on.

From Table 9.1 we can get information along average product and marginal product as shown in Table 9.2 and represented in Figure 9.2.

Table : 9.2 : Total, Average and Marginal Product of Wheat in tons on Four Hectares of Land

Number of Labourers (1)	Land Labour Ratio (2)	Total Output (3)	Average Product of Labour (4)	Marginal Product of Labour (5)
1	4.00	10.00	10.00	--
2	2.00	24.00	12.00	14.00
3	1.33	39.00	13.00	15.00
4	1.00	52.00	13.00	13.00
5	0.80	61.00	12.20	9.00
6	0.67	66.00	11.00	5.00
7	0.57	66.00	9.40	0.00
8	0.50	64.00	8.00	-2.00

Table 9.2 gives the number of labourers employed, land, labour ratio, total output, average product and marginal product. Column 2 gives us land-labour ratio. Land is fixed at 4 hectares of land by labourers to get land-labour ratios at different level of labourers employed. We get average product by dividing Column 3 by Column 1. We get marginal product by subtracting total output produced by say x labourers from total output by $x + 1$ labourers where x can be 1,2,3.......... 7.
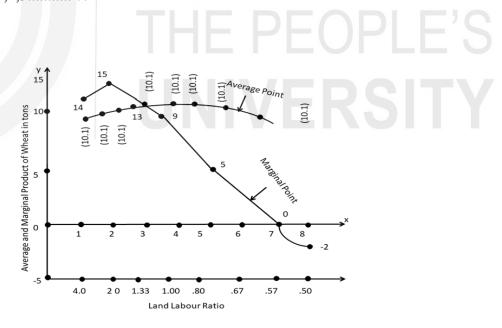

Figure 9.2 : Graphical Representation of Average and Marginal Product of wheat

The average and marginal product figures of Table 9.2 along with land-labour ratios and number of labourers employed are represented in Figure 9.2. The X-axis measures the number of labourers employed, Y-axis measures average and marginal product of wheat in tons. Below the X-axis, we have represented the land-labour ratios corresponding to each number of labourers employed. The figures corresponding to number of labourers employed and

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For More Clarity!

The **average physical product** is the total production divided by the number of units of variable input employed. It is the output of each unit of input. If there are 10 employees working on a production process that manufactures 50 units per day, then the average production of variable labour input is 5 units per day.

The **marginal physical product** of a variable input is the change in total output due to one unit change in the variable input (called the **discrete marginal product**) or alternatively the rate of change in total output due to an infinitesimally small change in the variable input (called the **continuous marginal product**).

---

average product are shown by the curve marked average product, and marginal product figures are shown by the curve marked marginal product. We can easily notice that marginal product rises in the beginning, becomes maximum (i.e. equal to 15) when 3 labourers are employed, then continues to fall until it becomes zero when 7 labourers are employed and finally becomes negatives (equal to -2) when 8 labourers are employed. Average product rises until 3 labourers are employed, becomes equal to marginal product (13) when 4 labourers are employed and after that it continues to fall. It is also worth noting that land-labour ratio continues to fall as we move away from the origin.

BRAIN TEASER

1. Answer the following questions:

   i) When marginal product increases, what happens to average product?

   ii) Does average product begin to fall as soon as marginal product does? Which occurs first, the point diminishing marginal or average returns?

   iii) When average product is at its maximum, is marginal product less than, equal to, or greater than average product?

   iv) Does total product increase at a decreasing rate

      a) when average product is rising?

      b) when marginal product is rising?

      c) when average product beings to fall?

      d) when marginal product passes its maximum value?

   v) When average product equals zero, what is total product?

Answers:

i)   Average product also increases but is less than marginal product.

ii) No, The point of diminishing marginal returns occurs first.

iii) When average product is at its maximum, average product and marginal product are equal.

iv)

   a)   Initially, total product increases at an increasing rate but after marginal product being to fall, total product increases at a diminishing rate.

   b)   Total product increase at an increasing rate.

   c)   Total product increase at a decreasing rate till the marginal product is positive and is more   than zero.

   d)   After the marginal product has passed its maximum value and begins to decline, total product increases at a decreasing rate.

v)   Total product is also zero.

9.4.4   Three Stages of Production

From the above, we can easily identify three stages of production. Look at Figure 9.3 where these three stages of production have been shown.
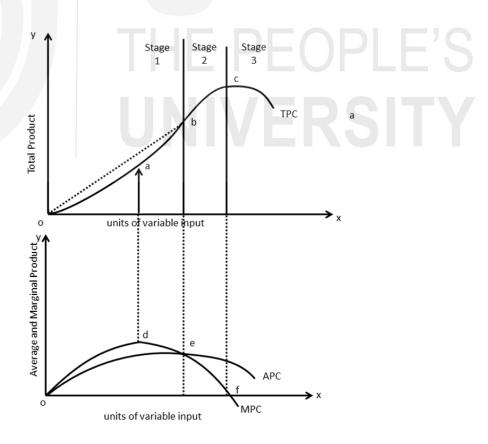

Figure 9.3 : Graphical Representation of Total, Average and Marginal Product

Let us start with Total Product curve up to point 'a' on the curve, total product rises at a rising rate as more of variable input is employed. From point 'a' to point 'b' total product continues to rise but at a falling rate and the rate of increase of total output progressively falls from point 'b' to point 'c'. At 'c' total output becomes maximum and begins to fall beyond that. Marginal product at first increases and reaches a maximum at point d' which is also the point of diminishing marginal physical returns and falls thereafter. After a stage it becomes negative. Average product rises until it reaches its maximum at point 'e' where marginal and average products are equal. It subsequently declines and will become zero when total product becomes zero.

On the basis of above discussion three stages of production can be described as follows:

i)   **Stage 1** corresponds to the use of the variable input to the left of point 2 where average product achieves its maximum.

ii) **Stage 2** corresponds to the use of the variable input between point 'e' and point 'f' where the marginal product of the variable input becomes zero.

iii) **The Stage 3** corresponds to the use of variable input to the right of point 'e' where the marginal product of the variable input negative.

The rising, the falling and the negative phases of the total, marginal and average products are the different stages of the Law of Variable Proportions. The total output first rises at an increasing rate and then reaches the highest point at a decreasing rate and starts falling thereafter.

Stage	Total Product	Marginal Product	Average Product
Stage I	Initially increases at an increasing rate, and subsequently at a diminishing rate.	Increases initially, reaches the maximum and then falls	Increases throughout the stage and reaches the maximum.
Stage II	Continues to rise at a *diminishing rate*, and eventually reaches the maximum	Continues to fall and eventually becomes zero	Begins to fall.
Stage III	Begins to fall	Becomes negative	Continues to fall, but is always positive.

9.5   THE LAW OF DIMINISHING MARGINALRETURNS

In Figure 9.3 you have seen that up to point 'a' we have a situation where total product, average product and marginal product are rising as more units of variable input are employed. It can be put differently by saying that total product is rising at a rising rate up to point 'a'. Beyond 'a' and up to point 'c' we find marginal product is falling until it becomes zero at point 'f'. Average

product starts falling beyond point 'e' (where average product is equal to marginal product). But from point 'a' to point 'c', since marginal product falls, total product rises but at a falling rate. This situation of the total product rising at a falling rate or the marginal product falling is referred to as the **application of the law of diminishing marginal returns**. We can also say that the law of diminishing marginal returns is a special case of the law of variable proportions. Similarly, up to point 'a' we find that total product rises at rising rate or marginal product rises. This is referred to as the **law of increasing marginal returns.** To begin with, each industry operates in such a manner that it is able to best utilize the fixed inputs and thus keeps enjoying the advantage of total product rising at a rising rate or marginal product rising. Beyond a point when variable to fixed input proportion is optimum, it is no longer possible to enjoy increasing marginal returns. In fact as more of variable input is added to fixed inputs, total product rises but only at falling rate implying thereby the operation of the law of diminishing marginal returns. The application of **the law of diminishing marginal returns** is subject to a number of assumptions, which are as follows:

1) It is possible to vary the proportions in which the various inputs are combined.

2) Only one input is variable while others are held constant.

3) All units of a variable input are homogeneous.

4) There is no change in technology. If the technique of production undergoes: change, the total product curve will be shifted upwards.

5) Input prices remain unchanged.

With a few assumptions the law of diminishing marginal returns is applicable to a wide range of production activities. In some productive activities, it may operate quickly and in some, its operation may be delayed. This law has been found to be applicable in agricultural production more quickly than in industrial production, because in the former, a natural factor (i.e., land), plays a predominant role, while in the latter man-made factors plays the major role.

The law also applies to river-fisheries where the application of additional doses of labour does not bring about a proportionate increase in the amount of fish caught. Similarly, in the case of quarries (mines) and brick fields the continued application of labour will result in a diminishing marginal return. This happens because cost will rise in proportion to the production as mining operations are extended deep into the mines. The law applies to buildings where the building of a skyscraper requires additional expenses for providing artificial light and ventilation to the lower storey's and lifts to reduce the inconvenience of going to the higher floors. This means increase in costs and diminishing marginal returns. It would not be correct to say that this law applies to agriculture alone; it operates in all types of industries. Its application can be postponed by technological advancements but eventually a stage is reached when the operation of the law of diminishing marginal returns will set in.

Check Your Progress B

1) Describe the law of variable proportions.

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2) Define Total, Average and Marginal Products

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3) State whether the following statements are **True** or **False.**

   i)   Fixed inputs remain fixed in the long run.

   ii) In the short run we normally have fixed factor proportions.

   iii) Stage 1 of production corresponds to law of diminishing marginal returns.

   iv) When average product equals zero, total product is maximum.

   v)   When average product is maximum, marginal product is greater than average product.

   vi) The point of diminishing marginal returns occurs earlier than average returns.

   vii) The law of diminishing marginal returns applies to agriculture alone.

   viii) The law of variable proportions is a special case of the law of diminishing marginal returns.

4) Fill in the blanks.

Units of Variable Input	Total Product	Average Product	Marginal Product
9	1,146	-	-
10	1,234	-	-
11	1,314	-	-
12	1,384	-	-
13	1,444	-	-
14	1,494	-	-

9.6   LET US SUM UP

Production is the creation of different usable goods and services. The theory of production deals with the transformation of inputs into outputs. This theory has its relevance in price theory, theory of the firm, theory for the demand for factors of production and also in the theory of factor shares at the macro level. The production function is the functional relationship between quantities of inputs and outputs. $Q = (K,L)$ is the general form of the production function.

Inputs can be fixed and variable. In the short run some inputs are fixed and others can be regarded as variable. In the long run, all inputs are variable. The law of variable proportions is the operation of the theory of production in the short run. We assume that conditions of variable proportions as opposed to fixed proportions exist for the law to apply.

The law of variable proportions states: As the quantity of a variable input is increased by an equal amount, keeping the quantities of other inputs constant, total output will increase, but after a point, at a diminishing rate. Total product rises initially at a rising rate, then at a falling rate as more of a variable input is combined with fixed inputs. The marginal product rises, becomes maximum and then begins to fall until it becomes zero as more of a variable input is used.

There are three stages of production. Stage 1 corresponds to use of the variable input to the left of a point where average product becomes maximum. Stage 2 is a situation where the marginal product of the variable input becomes zero and Stage 3 corresponds to the point where marginal product of the variable input becomes negative. The law of diminishing marginal returns is a special case of the law of variable proportions. The law of diminishing marginal returns operates beyond a point where marginal physical product becomes the maximum with the use of a variable input. This law is based on two important assumptions namely, (1) technology remains unchanged and (2) all units of a variable input are homogeneous.

This law has wide applications ranging from agriculture, fisheries and industry. It has more or less a universal application in all production activities. Its application can be postponed by technology advancements but eventually it does start applying.

9.7   KEY WORDS

Average Product: Total physical product divided by units of variable inputs.

Fixed Inputs: Those inputs whose quantity does not change with immediate change in output in which they enter as inputs.

Homogeneous Unit: A unit which is uniform in relation to other unit of a factor or input.

Inputs: Whatever goes into the production of goods and services.

Intermediate Inputs: Inputs produced by other domestic producers of an economy or coming from other countries.

Long Run: That period of time in which all inputs are taken to be variable.

Marginal Product: The addition to total physical product by employing one extra unit of a variable input.

Macro Theory: Theory explaining aggregate variables like national income or employment or factor shares in national income, etc.

Production: The creation of different usable goods and services.

Production Function: A functional relationship between quantities of inputs and outputs.

Primary Inputs: Inputs provided by the services rendered by land, labour, capital and enterprises.

Semi-Finished product: A product between the stage of raw material and finished product.

Short Run: That period of time in which some inputs of factors of production are fixed and others can be regarded as variable.

Technology: Manner in which various inputs are combined to get a level of output.

Variable Inputs: Those inputs whose quantity changes with simultaneous change in output in which they enter as inputs.

9.8   ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

4   (i) Variable (ii) Variable (iii) Fixed (iv) Fixed (v) Fixed (vi) Fixed
(vii) Variable(viii) Variable/ Fixed.

5   (i) False (ii) True (iii) False (iv) False (v) False (vi) False (vii) False
(viii) False

Check your progress B

3   (i) False (ii) False (iii) False (iv) True (v) False (vi) True (vii) False,(viii)
False

Inputs	Average Product	Marginal Product
9	127.3	-
10	123.4	88
11	119.4	80
12	115.3	70
13	111.3	60
14	106.7	50

9.9 TERMINAL QUESTIONS

1) Define Production. What is the theory of Production?

2) Distinguish between primary and intermediate inputs.

3) Explain the relevance of theory of production in various fields.

4) Explain the concept of the production function.

5) Distinguish between fixed and variable inputs. What is the importance of this distinction in the theory of production?

6) Explain the law of variable proportions with the help of total, average and marginal product.

7) Explain the law of diminishing marginal returns. Also state its assumptions. Does it apply to agriculture alone?

> **Note: These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the University for assessment. These are for your practice only.**

UNIT 10   THE PRODUCTION FUNCTION-II

Structures

10.0   OBJECTIVES

After studying this unit, you should be able to:

• explain the laws of returns to scale;

• describe what is production function;

• describe an Isoquant and Isocost curve;

• enumerate properties of an isoquants;

• identify least cost combination of factors;

• distinguish between the nature of economies of scale and diseconomies of scale

• outline the relation between isoquants and returns to scale.

10.1 INTRODUCTION

In the previous unit, you have learnt that a change in factor proportions brings about a change in total output. Factor proportions are altered by keeping the quantity of one or some factors fixed and varying the quantity of the other. In this unit, you will learn the nature of laws of returns to scale where all the factors are increased in a given proportion. The laws of returns to scale will be explained with the help of Production Function, numerical examples and isoquants. We shall also discuss how a producing firm decides about the cast cost combination of factors. Economies of Scale will be introduced to explain the existence of increasing Returns to Scale. The concept of Diseconomies of Scale will also be introduced.

Table10.1: Differences between the Short-run and Long-run Production Functions

Short-run Production Function	Long-run Production Function
1. Short-run implies that planning horizon during which a firm cannot change some of the fixed factors of production (such as costly machines) to change its level of output	Long-run denotes that planning horizon during which a firm can change all the factors of production to change its level of output
2. The short-run production function shows the interdependence between output and the inputs consisting of both fixed and variable factors.	The long-run production function shows the interdependence between output and the inputs, all of which are variable in nature.
3. The short-run production function can be expressed as: X = f (K, L), where X = output, K = Fixed factor (say, capital) and L = Variable factor (say, labour)	The long-run production function can be expressed as: X = f (K, L), where both K and L are variable factors. Thus, the number of variable factors in the production function is relatively more in case of long-run production function

10.2 THE LAWS OF RETURNS TO SCALE

The long run production theory is concerned with input-output relationship under the condition that all inputs are variable factors. The long run production theory analyses the changes in output when all factors or inputs, in a particular production function, are increased together.

In other words, the behaviour of output in response to the changes in the scale is studied in the long run production theory. An increase in the scale means that all inputs or factors are increased in the same proportion.

Increase in the scale occurs when all factors or inputs are increased keeping factor proportions unchanged.

The long run production theory which is another name to the laws of returns to scale is thus an attempt to study the changes in output as a consequence of changes in the scale. More precisely, the laws of returns to scale explain how a simultaneous and proportionate increase in all the inputs affects the total output at its various levels.

10.2.1 Statement of the Laws of Returns to Scale

When a producing unit increases all its inputs proportionately, technically, there are three possibilities, i.e., the total output may increase proportionately, more than proportionately, or less than proportionately. Accordingly, we have three laws of returns to scale which are as follows:

1) **Constant returns to scale:** If a producing unit increases all its inputs in a given quantity (say X %) and the total output also increases in the same proportion (X %). then it implies the existence of **Constant Returns to Scale.** To take an example, suppose all inputs are doubles, and then if total output is also doubled, this would have been possible only when there exist constant returns to scale. In short, if increase in the total output is proportional to the increase in inputs, it means a situation of constant returns to scale exists.

2) **Increasing returns to scale:** If a producing unit increases its inputs say by X% and the total output increases by more than X%, then it implies the existence of **Increasing Returns to Scale.** To take an example, suppose all inputs are doubled, and then if total output is more than doubled, this would have been possible only when there exist increasing returns to scale. In short, if increase in the total output is greater than the proportional increase in the inputs, it means that a situation of increasing returns to scale exists.

3) **Diminishing returns to scale:** If a producing unit increases all its inputs say by X% and the total output increases by less than X%, then it implies the existence of Diminishing Returns to scale. To take an example, suppose all inputs are doubled, and then if total output is less than doubled, this would have been possible only when there exists diminishing returns to scale. In short, **if increase in output is less than proportionate to the increase in inputs, it means that a situation of diminishing returns to scale exists.**

10.2.2 Production Function and Returns to Scale

The laws of Returns to Scale can be explained more precisely through the Production Function which has already been introduced in Unit 8. Let us take a production model involving only two variable inputs, capital (K) and labour

(L) and one commodity X. The Production Function can then be expressed as:

$Q_x = f(K,L)$

Where Q_x denotes the quantity of commodity X, K stands for capital and L for labour employed. Let us further assume that both the inputs K and L are increased in the same proportion say p. It is quite likely that if all the inputs are increased in proportion p, the total output may not increase in p proportion. Suppose we represent the proportion by which output rises by h then the Production Function may be expressed as

$hQ_x = f(pK, PL)$

where, h denotes the h-time increase is Q_x as a result of p-time increase in inputs, K and L. The proportion h may be equal to, greater than, or less than p, accordingly, it brings out the three laws of returns to scales.

i)   If h= p, the production function reveals constant returns to scale.

ii)   If h > p, the production function reveals increasing returns to scale.

iii) If h < p, the production function reveals diminishing returns to scale.

Let us take a numerical example to explain three laws of returns to scale. Suppose a producing unit employs 5 labourers and one machine which gives it an output of say 100 units of a commodity. Assume that labour and machine are both variable inputs such that we are considering a situation of the long run.

Now, suppose the producing unit doubles the labour and capital employing 10 labourers and two machines and if the total output increases to 200 units, it means we have the existence of **Constant Returns to Scale** since 100% increase in labour and capital leads to 100% increase in output.

Further suppose that the employment of 10 labourers and two machines raises total output to 300 units, then 100% increase in labour and capital leads to 200% increase in output. This is, accordingly, termed as **Increasing Returns to Scale**.

Similarly, suppose that the employment of 10 labourers and two machines raises total output to 150 units, and then 100% increase in labour and capital lead to 50% increase in output. This is a situation of **Diminishing Returns to Scale.**

10.3   ISOQUANTS AND ISOCOSTS

There are various ways in which production function can be represented. It can be represented by tables, mathematical equations, and total, average and marginal product curves. When two factors or inputs are to be explicitly shown, production function can be represented by equal product curves or Isoquants. In order to get an optimal factor combination of a producing unit, we make use of Isoquants and Isocost Lines.

10.3.1 Isoquants

An Isoquant is a curve on which the various combinations of two factors say labour and capital give us the same level of output per unit of time. The table 10.1 below shows a hypothetical Isoquant schedule of a firm producing 100 units of a commodity.

Table 10.1 Tabular Representation of Isoquant

Combination	Labour input	Capital input	Total output (in units)
A	5	9	100
B	10	6	100
C	15	4	100
D	20	3	100

The information given in Table 10.1 has been represented on Figure 10.1 where labour units are measured along the x-axis and capital units on the y-axis. Point 'a' represents the combination of 5 units of labour and 9 units of capital to give an output of 100 units. Similarly, point b represents 10 units of labour and 6 units of capital to get an output of 100 units. Likewise, points 'c' and 'd' from the table are shown in the diagram. If we join points a, b, c and d, we get a curve known as an Isoquant.

A number of Isoquants representing different amounts of output are known as an Isoquant map. Look at Figure 10.1 where three Isoquants representing output of 100units, 200 units and 300 units respectively are shown which can be produced with altogether different combination of the two factors labour and capital.
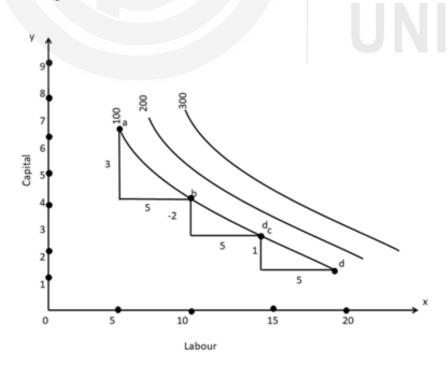

Figure 10.1: Graphical Representation of Isoquant

10.3.2 Marginal Rate of Technical Substitution

It may be noted that movement along an Isoquant indicates substitution of one factor for another. For example, movement from point a to b means that 5 units of labour is substituted for 3 units of capital or putting it differently it means that 3 units of capital can produce as much as 5 units of labour. The rate at which one factor can substitute another is called **marginal rate of technical substitution.**

In general terms, marginal rate of technical substitution of labour for capital may be defined as the amount of capital which can be replaced by one unit of labour, the level of output remaining the same.

It is worth noting that marginal rate of technical substitution of labour for capital keeps falling as we move along an Isoquant from point a to d.' Take for example, by moving from a to b we find that 5 units of labour are substituted for 3 units of capital, 5 units of labour are substituted for 2 units of capital as we move from b' to c and finally 5 units of labour are substituted for 1 unit of capital as we move from c to d. The rate, at which the marginal rate of technical substitution diminishes, as we move along an Isoquant from left to right, is a measure of the extent to which the two factors can be substituted for each other. The smaller the rate at which the marginal rate of technical substitution diminishes, the greater the substitutability between the two factors.

In the extreme case, if the marginal rate of substitution between any two factors remains constant, the two factors are perfect substitutes of each other and accordingly the Isoquant will be straight line falling from left to right. In reality marginal rate of technical substitution diminishes as more and more of capital is substituted for labour and, therefore, an isoquant is convex to the origin as shown in Figure 10.1.

The marginal rate of technical substitution of labour for capital can also be expressed as the ratio of the marginal physical product (already introduced to you in unit 9) of labour to the marginal physical product of capital. This result can be derived as follows:

Reduction in capital X marginal physical product of capital = increase in labour X marginal physical product of labour

or$\Delta K.MPK = \Delta L: MPL$

Or

$$\frac{\Delta K}{\Delta L} = \frac{MPL}{MPK} \text{ but } \frac{\Delta K}{\Delta L} \text{ is the Marginal Rate of Technical}$$

Substitution of Labour for Capital expressed as$\frac{MRTS}{LK}$

Therefore, $\dfrac{MRTS}{LK} = \dfrac{MPL}{MPK}$

In simple terms, the above relationship implies that as we move along an isoquant from point a to point d more labour is employed and marginal physical product of labour falls and the gain in total output is the result of change in labour and marginal physical product of labour. Further, as more labour is employed, less capital is employed but marginal physical product of capital rises and the gain in total output is the result of change in capital and marginal physical product of capital. Since on an isoquant, total output, by definition, remains unchanged, we equate the loss in output with gain in output and thus, as shown above,

MRTS the result $\dfrac{MRTS}{LK} = \dfrac{MPL}{MPK}$ is derived so the principle of diminishing

MPL is derived.

So the principle of diminishing marginal rate of technical substitution is merely an extension of the law of diminishing marginal returns to the relation between the marginal physical productiveness of labour and capital. Further, we are also able to realise why less and less of capital is required to be substituted by an additional unit of labour so as to maintain the same level of total output.

10.3.3 Properties of an Isoquant

You have been already introduced to the concept of an indifference curve in unit 8; the properties of an isoquant are the same as that of an indifference curve. The following are the important properties of an isoquant.

1) **An isoquant slopes downwards from left to right or it has a negative slope.** This is so because when the quantity of one input is increased, the quantity of the other input must be reduced so as to keep total output constant.

2) **Two isoquants cannot intersect each other**. If they do intersect it will mean that at the interaction point a given combination of two inputs will give two different levels of output. But this is quite absurd. How can the same input combination produce two different levels of output, techniques of production remaining unchanged.

3) **An isoquant is convex to the origin.** The convexity of an isoquant is due to the diminishing marginal rate of technical substitution. The convexity of an isoquant also implies the operation of the law of diminishing marginal returns. The diminishing marginal rate of technical substitution occurs, because of the fact that different factors are imperfect substitutes of each other in the production of a commodity. An isoquant is normally convex to the origin.

EXCEPTIONAL ISOQUANTS

We have assumed so far that the two factors–inputs are perfect substitutes for each other. We can also look at least two other possibilities.

1) Two factors are perfect substitutes for each other.

2) Two factors are perfect complements for each other.

1) **FACTOR-INPUTS ARE PERFECT SUBSTITUTES**

When two factors are perfect substitutes of each other, then each of them can be used equally well in place of the other, Therefore, the marginal rate of technical substitution between two perfect substitute factors remain constant. The shape of an isoquant in such a case is straight line. By looking at Figure 10.2 we can realise that for employing 5 extra units of labour, 2.5 units of capital are to be reduced as we move from point a to b or from point b to c.

In case two factors are perfect substitutes the shape of the isoquant will be as shown in Figure 10.2.

Figure 10.2 : Factor Inputs are perfect substitutes

2) **TWO FACTORS ARE PERFECT COMPLEMENTS**

Another exception to the shape of an isoquant occurs when factors are perfect complements. This case is shown in Figure 10.3. The isoquant is shown to be a right angled one. Perfect complementary factors are those which are jointly used for the production in a fixed proportion. Thus, 5 units of labour and 2 units of capital give us the level of output Q_1. An increase in one factor say capital without the required proportional increase in labour will not give additional output whatsoever.
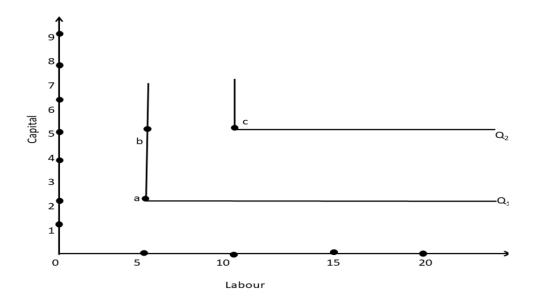
Figure 10.3 : Two Factors Are Perfect Complements

At point 5 units of labour and 2 units of capital give us output Q_1 Even if capital rises to 4 as shown by point b, output remains Q_1 since for the output to rise to Q_2 labour has to be increased to 10 units as shown by point c.

10.3.4 Isocosts

The output produced by two factors is represented by an isoquant. The prices of factors are represented by an isocost line. The knowledge of isocost line is important in determining what combination of factors a producing unit will choose to produce a given level of output.
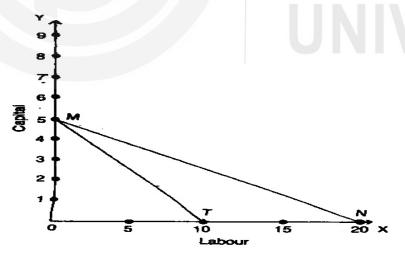

Figure 10.4: Isocost

An isocost line shows various combinations of two factors or inputs which a producing unit can buy with a given money or budget. This line is shown in Figure 10.4.

The method of drawing an isocost line is very simple. We assume that prices of labour and capital are/given to a producing firm. Suppose the firm has to

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spend Rs 100 and if wage rate is Rs 5 per labourer, then if the whole of money is spent on hiring labour, the maximum number of labourers which can be hired is 100 divided by 5 which gives us 20 and accordingly mark 20 on x-axis. Similarly, if price of capital is Rs 20 per unit, then the maximum of capital which can be bought by the firm is 5 units. Again mark 5 on y-axis. Now, join 5 and 20 by a straight line, this downward slopping straight line will make an intercept at 5 units on y-axis and 20 units on x-axis. This straight line is called isocost line as being shown as MN line in Fig. 10.4.

If the outlay or money with the firm falls isocost line will come down parallel to MN in Fig. 10.5. Conversely it will go up parallel to MN if outlay money with the firm rises. Thus, an isocost line depends up on two things (i) the total outlay which a producing unit has to make on the factors and (ii) prices of the factors of production. The slope of the isocost line is:

$$\frac{OM}{ON}$$ gives us the ratio of prices of labour to capital

or

$$\frac{OM}{ON} = \frac{\text{price of labour}}{\text{price of capital}}$$

The isocost line will change if prices of factors change outlay remaining the same. For example, if outlay remains Rs 100 but price of labour doubles from Rs 5 to Rs 10 per unit, the firm will be able to hire only 10 labourers, the mice of capital remaining unchanged, the new isocost line will be MT or ratio of prices of two factors will rise from the original OM/ON to OM/OT.

A. OUTLAY CHANGE

An increase in outlay will result in a rightward shift of the isoquant parallel to original Isocost line as shown in Fig. 10.5. This is indicated by shift from line KT to RS.
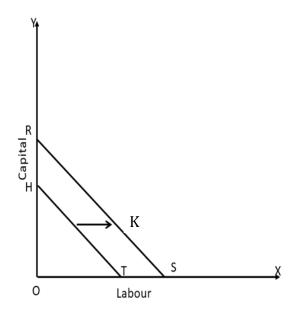
Figure 10.5: Shift in Isoquant due to rise in outlay

Likewise, if the outlay falls the line will shift to the left as shown in Fig. 10.6
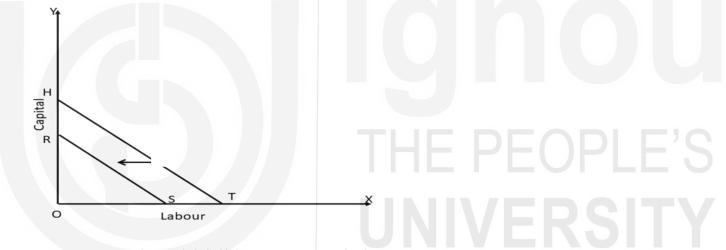

Figure 10.6: Shift in Isoquant due to fall in outlay

10.3.5 Least Cost Combination of Factors

Given isoquant map, representing the technical conditions of production and isocost map, representing various levels of total outlay (given the prices of labour and capital), we can get a producer's-equilibrium in regard to choice of inputs. The producer may desire to minimize his cost for producing a given level of output or he may desire to maximise his output level for a given outlay. Let us take a case where the producer has already decided upon the level of output and is only interested to find out the combination of factors which will minimize his total cost of production such that total profits get maximized. The equilibrium of the producer is represented at point P on the Figure 10.7 at which 10 units of labour and 2.5 units of capital are employed to get a level of output Q_1
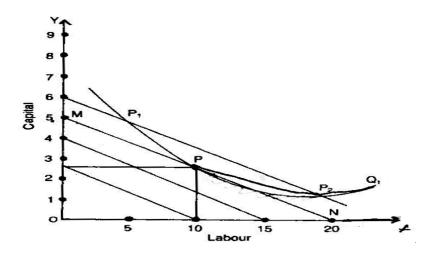
Figure 10.7: Producer's Equilibrium for inputs

The level of output Q_1 can be produced by any factor combination such as P, P_1, P_2 lying on the capital isoquant. The total cost, we can see, will be minimum at point P at which the isocost line MN is tangent to the isoquant representing Q_1, output. At no other point, the cost is minimum. So, it is clear that the tangency point of the given isoquant with an isocost line gives us the least cost combination of factors for producing a given output Q_1.

It has already been shown earlier that the slope of the isocost line represents the ratio of price of labour to price of capital. Further, the slope of the tangent on a point on an isoquant represents marginal rate of technical substitution of labour for capital. Thus, at point P the slope of the isocost line and the tangent on the isoquant are the same or

$$\frac{\text{Price of labour}}{\text{Price of Capital}} = \frac{\text{MRTS}}{\text{LK}} = \frac{\text{MPL}}{\text{MPK}}$$

Check Your Progress A

1) What is meant by returns to scale?

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2) What is an Isoquant?

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3) What is an Isocost-line?

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4) List three important properties of an Isoquant?

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5) State whether the following statements are **True** or **False.**

i)   In returns to scale, all inputs change in the same proportion.

ii) In the long run we get only constant returns to scale.

iii) If output of a firm goes up by 10% caused by 5% increase in all inputs, we have diminishing returns to scale.

iv) Marginal rate of technical substitution is always equal to price ratio of two factors.

v)   In case of perfect substitutes an Isoquant is L Shaped.

vi) An isoquant is convex to the origin because marginal rate of technical substitution remains constant.

10.4 ISOQUANTS AND LAWS OF RETURNS TO SCALE

The concept of Isoquants can be used to express the returns to scale. Look at Figure 10.8 where returns to scale are represented. Four Isoquants have been drawn showing level of output 100, 200, 300, and 400 units. Line OS has been drawn passing through the origin O. As we move along OS, the inputs of labour and capital vary. But since the OS line passes through the origin, the ratio between labour and capital remains the same throughout, though absolute amounts of labour and capital keep rising. So, increase in labour and capital along line OS represents the increase in the scale. Even OT line represents increase in the scale.
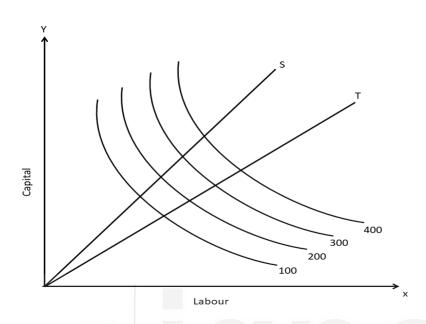
Figure 10.8: Returns to Scale

10.4.1 Constant Returns to Scale

Returns to scale are constant if output increases in the same proportion as the increase in all factors. Constant returns to Scale are shown with the help of Isoquants in Figure 10.9

Figure 10.9 : Constant Returns to Scale

Five Isoquants representing output of 50, 100, 150, 200 and 250 units are drawn by taking labour on X-axis and capital on Y-axis. Three rays are drawn from origin labelled OL, OS and OT. It can be seen that successive Isoquants are equidistant from each other along a ray S or T or L.

Thus, along the ray OS;

aS = bS = cS = dS = eS

Similarly,

along the ray OT aT = bT = cT = dT = eT

Finally, if we consider ray OL we find, aL = bL = cL = dL = eL

The same distance between the successive Isoquant means that if both labour and capital are increased in a given proportion, output expands by the same proportion.

10.4.2 Increasing Returns to Scale

Increasing Returns to Scale means that output increases in a greater proportion than increase in all inputs or factors. Increasing returns to scale are shown with the help, of Isoquants in Figure 10.10. Five Isoquants representing output of 50, 100, 150, 200 and 250 units are drawn by taking labour on X-axis and capital on Y-axis. The ray OS is drawn from the origin O. It can be seen that the successive Isoquants lie at decreasing smaller distances along the ray OS. We notice that

bs< as <cs<bs and ds <cs
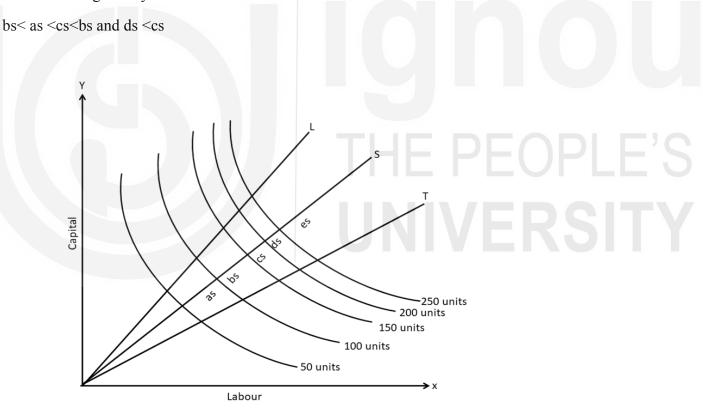
Figure 10.10 : Increasing Returns to Scale

This would hold true on other rays OF and OL also. We regard this as a case of increasing returns to scale because equal increases in output are obtained by smaller and smaller increments in inputs (labour and capital).

10.4.3 Diminishing Returns to Scale

When output increases in a smaller proportion than the increase in all inputs, diminishing returns to scale are said to prevail. Diminishing Returns to Scale are shown is Figure 10.11
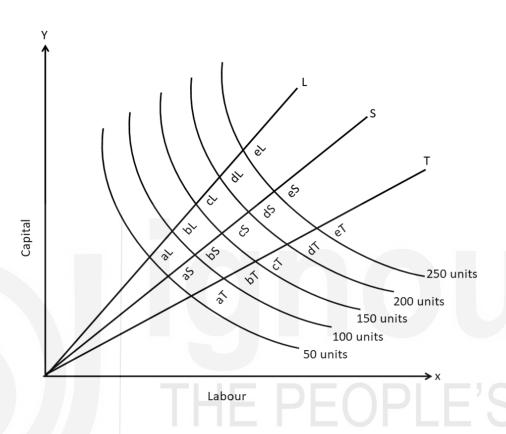

Figure 10.11: Diminishing Returns to Scale

Isoquants representing output of 50, 100, 150, 200 and 250 units are drawn by taking labour on X-axis and capital on Y-axis. The ray OS is drawn from the origin O. It can be seen that the successive Isoquants lie at increasing distances along the ray OS. We notice that

es> ds >cs>bs

This would hold true on other rays also, we regard this case as one of diminishing returns to scale because equal increments in output are obtained by more and more increments in inputs (labour and capital). You should not get an impression that different production functions exhibit different types of returns to scale; constant, increasing or diminishing. Normally, three phases of increasing, constant and diminishing returns to scale occur in a single production function.

For More Clarity!

In economics, returns to scale and economics of scale are related terms that describe what happens as the scale of production increases in the long-run, when all input levels including physical capital usage are variable (chosen by the firm). They are different terms and should not be used interchangeably.

In other words, as a producing firm starts production in the long run or when its scale, increases, first it witnesses increasing returns to scale, then a phase of constant returns, and beyond a point eventually, as the firm continues its expansion, decreasing returns sets in. The reasons for this sequence of increasing, constant and diminishing returns to scale will be analysed in the next section.

10.5 ECONOMIES AND DISECONOMIES OF SCALE

It is important to find out the reasons for the existence of increasing returns to scale and also why does eventually diminishing returns to scale set in? The existence of economies of scale are said to be responsible for the emergence of increasing returns to scale. But the economies of scale cannot continue indefinitely and accordingly the diminishing returns to scale are attributed to the diseconomies of scale.

10.5.1 Economies of Scale

Economies of scale are the advantages which a producing unit enjoys by expanding the size of plant and the scale of operation. These advantages or economies enable a firm to get proportionately larger output than increments in factor inputs or after adjusting all inputs. Optimally, the average cost of production can be reduced by increasing the size of the plant. These economies of scale are also referred to as internal economies because they are peculiar to a particular producing unit and are enjoyed by it by expansion of its own scale of production. Some of the economies of scale are given as follows:

1) **Higher degree of specialisation and division of labour:** As scale of production expands, higher degree of specialisation of both machinery and labour becomes possible. The use of specialised machinery and labour increases productivity per unit of inputs. Their cumulative effects contribute to increasing returns to scale. As scale of production increases more labour is employed and the opportunities for specialisation and division of labour are captured by the producing unit. A larger plant with a larger workforce may enable each worker to specialise in one job, gaining proficiency and waste less time in moving about from one job to another and also in changing tools. Thus, important savings may be realised by increasing the scale of production. The specialisation may also take the form of machinery which a particular machine may be earmarked for a particular task in which it can be best used.

2) **Technical indivisibilities:** Some factors, particularly mechanical equipment, used in the process of production are available in a minimum size. Full use of them can be made only when production is carried on a large scale but because of indivisibility or lumpiness, they have to be employed even at a small level of output. Such inputs cannot be divided into small sizes to suit the small scale of production. Thus because of indivisibility of such factors, they have to be employed in a minimum

quantity even if scale of production is relatively small. Therefore, when scale of production is increased by increasing all inputs, productivity of indivisible factor increases considerably and thus, in turn, results in increasing returns to scale.

3) **Managerial economies:** Like specialised machines, managerial skills are also indivisible. Suppose a manager can optimally supervise 10,000 units of production in a week but only 5,000 units are produced in a week then the managerial cost gets distributed over less units of output. It will be possible to reduce cost per unit until 10,000 units are produced or total output will rise, proportionately more with increments of labour and capital inputs. The extent to which managerial economies can be enjoyed by a producing unit depends on the efficiency of the manager.

4) **Superior machinery :** The increase in the scale of production enables the efficiency of factors to be increased by the introduction of superior and more specialised machinery. So, even if there is no lumpiness of a factor and all factors are proportionately increased, increasing returns may operate because of the possibility of introducing more superior and specialised machinery. The possibility of installing technologically more efficient machinery is an equally important factor responsible for increasing returns to operate initially.

5) **Dimensional relations:** Increasing returns to scale is also a matter of dimensional relations. For example when the size of a room (10'$\times$5' = 50 sq ft) is doubled (20'$\times$10') the area of the room is more than doubled (i.e.= (equal to) 200 sq.ft.)

Similarly, if we double the number of bricks and other inputs that go with them, the storage capacity of the warehouse is more than doubled. This is thus a case of increasing returns to scale. Similarly, if the diameter of a pipe is doubled, the flow of water is more than doubled. Following the same logic when labour and capital are doubled, the output is more than doubled.

10.5.2 Diseconomies of Scale

Diseconomies of Scale are the disadvantages which a producing unit gets by: expanding the size of the plant or scale of production beyond a particular level. Diseconomies of scale are also referred to as internal diseconomies because they are peculiar to a particular producing unit. Some of the diseconomies of scale can be enumerated as follows:

1) **Limitations to efficient management:** Managing a unit entails controlling and coordinating a wide variety of activities such as production, sales, advertisement, transportation etc. As the scale of plant expands beyond a particular point, top management is forced to delegate responsibility and authority to lower management. This leads to loosening of control and thus the efficiency of operation begins to

decline. Even if all the variable factors are increased in a given proportion, total output does not increase by the same proportion.

2) **Limited uses of the natural resources:** If production is defined as mining of natural resources, then this factor is very important. For example, doubling of coal mining plants may not double the coal output because of limitedness of coal deposits or difficult accessibility to coal deposits. Similarly, doubling the fishing fleet may not double the fish output because the availability of fish may decrease when fishing is carried out on an increasing scale.

It is quite difficult to determine when diseconomies of scale set in and when they become strong enough to outweigh the economies of scale. One thing can be safely stated that diseconomies become important when economies of scale are negligible. Even after the efficiency of management begins to fall, technological economies of scale may offset the diseconomies over a wide range of outputs. Diseconomies of scale primarily arise because of management factor while economies of scale arise because of technological, management or technical indivisibility. It is only when management diseconomies of scale outweigh economies of scale arising because of management and factors the net diseconomies of scale will exist to explain the emergence of diminishing returns to scale.

RESULTS

1. IRS occurs when E > D

2. CRS occurs when E = D

3. DRS occurs when E < D

Where, E = Economies of Scale, and

      D = Diseconomies of scale

    IRS= Increasing return to Scale

   CRS= Constant return to Scale

   DRS= Decreasing return to scale

Check Your Progress B

1) What are economies of scale?

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2) Define managerial and technological economies of scale.

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3) What are the diseconomies of scale?

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4) Fill in the blanks.

   i) If output increases in the same proportion as the increase in all inputs, we have..............returns to scale.

   ii) If successible Isoquants lie at decreasing smaller distances along a ray starting from the origin we have.......returns to scale.

   iii) If inputs required increase in large proportion than the total output we have ……….. returns to scale.

   iv) A firm first witnesses……………….....returns to scale, then. ......returns to scale and finally…………...returns to scale.

   v) Economies of scale are only available to a firm with the expansion of its............of production.

   vi) Lumpiness of capital is responsible for the existence of ....scale.

   vii) Diseconomies of scale explain the existence of ……………….. ....returns to scale.

   viii) Diminishing returns to scale is witnessed at the ....by a firm.

10.6 LET US SUM UP

The long run production theory is concerned with input output relationship under the condition that all inputs or factors are variable factors. The laws of returns to scale are studied under the long run production theory. There are three laws of returns to scale:(i) Constant returns to scale, (ii) Increasing returns to scale, and (iii) Diminishing returns to scale.

Constant returns to scale operate when increase in the total output is proportional to the increase in inputs or factors. Increasing returns to scale operate when total output is greater than the proportional increase in the inputs. Diminishing returns to scale arise when increase in output is less than

proportional to the increase in inputs. The laws of returns to scale can also be explained with the help of production function.

An isoquant is a curve on which the various combinations of two factors say labour and capital give us the same level of output per unit of time. An isoquant slopes downwards from left to right, two isoquants cannot intersect each other and it is convex to the origin. The convexity of an Isoquant implies that marginal rate of technical substitution between two factors falls as more of a factor is employed.

Marginal rate of technical substitution of labour for capital is defined as the amount of capital which can be replaced by one unit of labour, the level of output remaining the same. Marginal rate of technical substitution of labour for capital is equal to the ratio of marginal physical product of labour to capital. It is also given by the slope tangent drawn at a particular point on the isoquant.

In case of perfect substitutes of two factors, the isoquant is a straight line implying constancy of marginal rate of technical substitution. In case of perfect complements of two factors, the isoquant is L-shaped. An isocost line represents various combinations of two factors which can be bought with a given money or budget. The slope of an Isocost line represents the price ratio of labour to capital.

Given an isoquant and a map of isocost a producer can find out that combination of factors which will minimise his total cost of production such that total profits get maximised. This happens at a point where ratio of price of labour to capital is equal to marginal rate of technical substitution of labour for capital which is also equal to ratio of marginal physical product of labour to capital.

The laws of returns to scale can be represented with the help of isoquants. If the distance between the successive isoquants remains the same along a ray passing through the origin, we have constant returns to scale. If successive distance between the successive isoquants keeps falling, increasing returns to scale exist. Similarly, if successive distance between the successive isoquants keeps rising, diminishing returns to scale exist. A producing firm first witnesses increasing returns to scale, then

Increasing returns to scale arise because of an emergence of economics of scale which are the advantages production units enjoys by expanding the scale of operations. Economies of scale arise because of (1) higher degree of specialisation and division of labour, (2) technical indivisibilities or lumpiness of some factors, (3) managerial indivisibility, (4) superior techniques being employed and, (5) dimensional relations.

Diseconomies of scale or disadvantages of the expansion of scale of output primarily arise because of management increasingly losing control over various operations of the production unit. Sometimes, diseconomies of scale also arise because of limitedness of the natural resources. Diseconomies of scale explain the existence of diminishing returns to scale.

10.7 KEY WORDS

Constant Returns to Scale: A simultaneous and proportionate increase in all the inputs leading to proportionate increase in total output.

Convexity of an Isoquant: The falling tendency of marginal rate of technical substitution on an Isoquant.

Diseconomies of Scale: The disadvantages faced by a producing unit by enlarging its scale of production.

Equilibrium of a Producer: Given output he likes to combine factors in a manner that total cost is minimized or given input he likes to produce that level of output at which total profits are maximized.

Economies of Scale: The advantages enjoyed by a producing unit by enlarging its scale of production.

Increasing Returns to Scale: A simultaneous and proportionate increase in all the inputs leading to more than proportionate increase in total output.

Isoquant: Curve on which the various combinations of two factors give the same amount of output. Most typically, an isoquant shows combinations of capital and labour and the technological trade-off between the two.

Isocost Line: Various combinations of two factors which can be bought with a given money or budget.

Marginal Rate of Technical Substitution: The amount of a factor which can be replaced by one unit of another factor the level of output remaining the same.

Perfect Substitutes: The marginal rate of technical substitution of two factors is constant.

Perfect Complements: Proportion in which two factors are combined is fixed.

Ray: A line passing through the origin cutting across Isoquants.

Returns to Scale: A simultaneous and proportionate increase in all the inputs affecting the total output.

Slope of an Isoquant: The marginal rate of technical substitution of a factor for another factor.

Technical Indivisibility: A factor which cannot be divided into as small units as one likes.

10.8 ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

5 (i) True (ii) False (iii) True (iv) False (v) False (vi) False.

Check your progress B

4   (i) Constant (ii) Increasing (iii) Diminishing (iv) Increasing, Constant, diminishing(v) Scale (vi) Economics (vii) Diminishing (viii) Last Stage

10.9   TERMINAL QUESTIONS

1)   What is meant by returns to scale?

2)   Explain the concept of Isoquant and Isocost.

3)   Explain returns to scale with the help of a Production Function.

4)   Distinguish between increasing and diminishing returns to scale with the help of Isoquants.

5)   Explain with the help of Isoquant and Isocost the least cost combination of factors to achieve a given level of output.

6)   Define marginal rate of technical substitution of capital for labour. Use a diagram.

7)   What are the properties of an Isoquant?

8)   Derive the Isoquants if two factors are perfect substitutes and perfect complements.

9)   What is meant by economies of scale? How do they explain increasing returns to scale?

10) What are the main types of economies of scale?

11) Explain the concept of diseconomies of scale?

Note: These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the university for assessment. They are for your practice only.

UNIT 11 THEORY OF COSTS AND COSTCURVES

Structure

11.0 Objectives

11.1 Introduction

11.2 Theory of Costs

11.3 Economic Costs

11.4 Short Run Cost Curves

11.5 Long Run Cost Curves

11.6 Other Costs

11.7 Let Us Sum Up

11.8 Key Words

11.9 Answers to Check Your Progress

11.10 Terminal Questions

11.0 OBJECTIVES

After studying this unit, you should be able to:

- identify the factors determining cost
- distinguish various types of costs ,
- trace the shape of short run cost curves
- explain marginal cost
- distinguish between fixed and variable costs
- make cost schedule and draw various related cost curves
- explain why an average cost curve is U-Shaped
- find out the relation between short run cost and long run cost.

11.1 INTRODUCTION

In previous units have learnt the relation between inputs or factors and outputs. Inputs used to produce output are available only at a price. Therefore, the generation of output over a period is possible only at a cost. The producer would like to minimise his cost. In this unit you will study the determinants of costs. You will be introduced to the concepts of accounting costs, economic costs, opportunity cost, private cost, social cost and real cost. The short run average cost, short run marginal cost, fixed and variable costs, and the long run cost will be introduced. How do various costs behave with change in the level of output will also form a part of the contents of this unit.

11.2 THEORY OF COSTS

Theory of costs of a producing firm relates total cost to the level of output. We may construct a table including the level of costs at various levels of output. This table is called the cost schedule. Similarly, the costs may be expressed in a mathematical form which is called the cost function. Finally, the relation of total costs to output may be expressed in the form of a curve which is referred to as the total cost curve.

The cost of production of a firm is determined by the following factors.

1) **Physical conditions of production :** The generation of output of a firm depends on the nature of inputs required to give rise to a particular level of output. This information we get from production function which is already introduced to you in unit 8 and unit 9.

2) **Price of factors of production :** The physical inputs required to get a level of output are no doubt given by the nature of production function. But the inputs are available to a firm at a particular price. For example, labour is available at a particular wage, capital at a particular interest and land at a specific rent. Similarly, an entrepreneur works for profit. The determination of wage, interest, rent and profit will be discussed subsequently. The product of physical units of an input and price of an input give us cost of that input. The addition of the value of all the inputs give us total cost of production.

3) **Efficient use of inputs :** In Unit 9 the operation of least cost combination of inputs to get a level of output has been introduced. The tangency of isocost line to the isoquant gives us the least cost combination of inputs. It is also explained that the tangency also implies the equality of marginal rate of technical substitution with the input price ratio. Thus, if a firm aims at minimising costs we can get the total cost at different levels of output. It will be assumed that for each level of output the firm chooses least cost combination of inputs. In other words, the firm chooses an input combination which lies on the expansion path corresponding to a given level of output.

11.3   ECONOMIC COSTS

The Concept of Economic Cost is used in Economic Theory. It includes explicit and implicit costs. Explicit cost include the payment and charges made by the entrepreneur to the suppliers of various productive factors like land, labour, capital and raw materials. Thus, the rent paid for the building hired by the firm, wages paid to the labourers hired, interest paid on the money borrowed for doing business and prices paid for the raw materials, fuel and power, etc. used together constitute explicit costs.

Implicit cost consists of (a) the normal return on capital invested by the entrepreneur himself in his own business, which he could have earned had he invested his capital in a venture other than his own. (Suppose, a producer invests Rs 10,000 to start a business out of his personal resources. Had he invested this capital somewhere else he would have been able to get a return of say, Rs 1,000 per year. Thus, Rs 1,000 is one component of implicit costs.) (b) the wages or salary the entrepreneur could have earned had he sold his services to others. Again suppose the entrepreneur instead of starting his own business decided to work as a manager with some other firm at a salary of Rs. 2,000 per month, then Rs 2,000 is another component of implicit costs.

The implicit costs, thus, incurred in producing a commodity or service is the amount that could be earned in the best alternative use of the entrepreneur's money (or capital) and time. Given implicit costs, economic costs can be defined as follows:

Economic costs =Explicit costs + Implicit costs

An economist whenever he refers to costs has in mind the concept of economic costs. Accordingly, economic profits are equal to total revenue (Price X Quantity sold) minus total economic costs. Even if total revenue is equal to total economic costs, the firm still enjoys some profits (called normal profits equal to implicit cost) though economic profits are equal to zero. These details will be explained subsequently.

Check Your Progress A

1)   What are economic costs?

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2)   Distinguish between implicit costs and explicit costs.

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3) Fill in the blanks

   i)   For economist by costs mean ....

   ii) When total revenue is equal to total economic costs, economic profits are equal to...

   iii) Economic costs =.................... + ...

   iv) Wages paid by a firm to the labour hired are..............costs.

   v)   If an entrepreneur instead of working in some other firm and getting Rs. 20,000 p.m. as salary, starting his own business, then Rs. 20,000 is........

11.4   SHORT RUN COST CURVES

The short run is analytically defined as a situation in which the inputs of some factors cannot be varied even if the level of output changes. These inputs which cannot be changed are called fixed inputs or fixed factors. There are other inputs or factors which are increased with more output and decreased with less output. The inputs or factors that can be varied in the short run are called variable inputs or variable factors. The short run should not be confused with calendar period. The salient feature of short run is that there are some factors which are fixed and there are others which are variable.

Fixed and Variable Costs

Fixed Costs are those which do not vary with output. It can also be stated that fixed costs are the costs of employing fixed factors which by definition, do not undergo a change in the short run. **The total cost of employing fixed factors in the short run is called total fixed costs.** The fixed costs include costs such as (i) salaries of managerial and administrative staff, (ii) rent of building, and (iii) interest on capital.

Variable costs are all those costs that vary directly with output, increasing as more is produced and decreasing as less is produced. Alternately variable costs are the costs of employing variable factors. The total cost of employing variable factors is called total variable costs. Variable costs are also known as direct costs or prime costs. Variable costs include cost of (i) raw materials, (ii) running plant and machinery, such as fuel, routine maintenance, and (iii) unskilled and semi-skilled labour etc. **Total cost of producing any level of output is the sum of total fixed cost and total variable cost. Since total fixed cost remains fixed by definition, the variation in total cost can be explained only by change in total variable cost**.

Total cost divided by total quantity produced gives us average cost or also known as **average total cost.** Total fixed cost divided by the number of units produced gives us **average fixed cost**. Total variable cost divided by the number of units produced gives average variable cost. The average total cost can also be arrived by adding an average fixed cost and average variable cost.

The relation between various costs can be summarised as follows:

TC = TFC + TVC   (i)

Where TC stands for total cost, TFC for total fixed cost and TVC for total variable cost. If variable in (i) are divided by units of quantity produced (Q) we get average costs.

$$\frac{TC}{Q} = \frac{TFC}{Q} + \frac{TVC}{Q}$$ (ii)

or

ATC = AFC + AVC   (iii)

Where ATC is average total cost, AFC is average fixed cost and AVC is average variable cost.

11.4.2 Marginal Cost

Marginal Cost is defined as the increment in total cost required to produce one extra unit of output. This can be explained with the help of an example.

Suppose the total cost of producing 10 units of a commodity is Rs. 1,000 and the total cost of producing 11 units of the same commodity is Rs 1,100. Then marginal cost of producing the 11th unit of the commodity is Rs. 1,100-Rs 1,000 = Rs 100

MC of $(X + 1)$ th unit is TC of $X + 1$ units minus TC of X units. Where X stands for units of the commodity produced.

Since only variable cost changes in the short run, marginal cost of $(X + 1)$th unit can be defined as TVC of $X+1$ units minus TVC of X units.

If output of a commodity does not change by precisely one unit, MC is defined as $\frac{\Delta TVC}{\Delta Q}$ where ΔTVC represents change in total variable cost and ΔQ change in units of commodity produced.

PROOF

$$MC_N = \frac{\Delta TC}{\Delta Q}$$

$$= \frac{\Delta TVC + \Delta TFC}{\Delta Q}$$

$$= \frac{\Delta TVC}{\Delta Q} + \frac{\Delta TFC}{\Delta Q}$$

$$= \frac{\Delta TVC}{\Delta Q} + \quad Zero$$

(Since TFC remains the same at all level of Output, ΔTFC will always be zero)

$$= \frac{\Delta TVC}{\Delta Q}$$

i.e. MC is determined only by TVC

11.4.3 Cost Schedule

Let us represent various costs, discussed above, in relation to the level of output with the help of the following schedule representing hypothetical data.

Table 11.1 Tabular Representation of **Cost Schedule**

Q	TFC	TVC	TC	AFC	AVC	ATC	MC
Quantity Of output (units) (1)	Total fixed cost (Rs) (2)	Total variable cost (Rs) (3)	Total cost (Rs) (4)	Average Fixed Cost (Rs.) (5)	Average Variable Cost (Rs.) (6)	Average total cost (Rs.) (7)	Marginal Cost (Rs.) (8)
0	400	-	400.00	-	-	-	-
1	400	40.00	440.00	400.00	40.00	440.00	40.00
2	400	64.00	464.00	200.00	32.00	232.00	24.00
3	400	84.00	484.00	133.33	28.00	161.33	20.00
4	400	104.00	504.00	100.00	26.00	126.00	20.00
5	400	120.00	520.00	80.00	24.00	104.00	16.00
6	400	144.00	544.00	66.67	24.00	90.67	24.00
7	400	182.00	582.00	57.14	26.00	83.14	38.00
8	400	224.00	624.00	50.00	28.00	78.00	42.00
9	400	288.00	688.00	44.44	32.00	76.44	64.00
10	400	360.00	760.00	40.00	36.00	76.00	72.00
11	400	436.00	836.00	36.36	39.64	76.00	76.00
12	400	521.60	921.60	33.33	43.48	76.81	85.60
13	400	640.00	1040.00	30.76	49.24	80.00	118.40
14	400	792.00	1192.00	28.56	56.64	85.20	152.80
15	400	998.00	1398.00	26.68	66.52	93.20	205.20
16	400	1296.00	1696.00	25.00	81.00	106.00	298.00
17	400	1674.00	2074.00	23.52	98.48	122.00	378.00

18	400	2156.00	2556.00	22.24	119.76	142.00	482.00
19	400	2792.00	3192.00	21.04	146.96	168.00	636.00
20	400	3600.00	4000.00	20.00	180.00	200.00	808.00

The calculations in the Table 11.1 are explained below:

1) TFC given in Column 2 are given irrespective of the level of output and therefore is taken as Rs 400 throughout.

2) TVC given in Column 3 is rising with increase in output.

3) TC in Column 4 is addition of TFC of Column 2 and TVC of Column 3 at each level of output. For example when output is 2 units, TFC is 400, TVC is 64 and therefore, TC is 400+ 64 = 464.

4) AFC in Column 5 is TFC of column 2 divided by quantity of output in Column 1. For instance, AFC at 3 units of output is Rs 400 divided by 3 equal to Rs. 133.33

5) AVC in Column 6 is TVC of Column 3 divided by quantity of output of Column 1. For example when output is 4; TVC is 104 and, therefore, AVC is 104 divided by 4 equal to 26.

6) ATC in Column 7 is TC of Column 4 divided by quantity of output of Column 1. For example when output is 5, TC is 520 and, therefore, ATC is 520 divided by 5 equal to 104.

   Alternately ATC can be found out by adding AFC of column 5 and AVC of Column 6 at each quantity of output. Thus, when output is 5, AFC is 80 and AVC is 24 and hence ATC is 80 plus 24 equal to 104.

7) MC in Column 8. is arrived at by subtracting TC of given quantity of output from TC of quantity of output increased by one unit. Thus TC of 4 units of output is Rs 504 and TC of 14+1 = 5 units of output is Rs. 520 as given in Column 4. From Rs 520 deduct Rs 504 we get Rs 16 which is the MC of 5th unit of output. Alternately MC can also be found out by utilising TVC data. TVC of 5 units of output is Rs 120 and TVC of 4 units of output is Rs. 104 and, therefore, MC of 5th unit of output is Rs 120 minus Rs 104 equal to Rs. 16.

11.4.4 Total, Fixed and Variable Cost Curves

The information given in Table 11.1 will be represented in two parts.

i.   Total cost curves, and

ii. Per Unit Cost curves

In this section the data contained in columns 1, 2, 3 and 4 will be represented with the help of total fixed cost curve (TFCC), total variable cost curve (TVCC) and total cost curve (TCC) as shown in Figure 11.1.

On the X-axis quantity of output is measured and on the Y-axis cost is measured in rupees. For each quantity of output TFC remains fixed at Rs. 400. Accordingly, TFCC is parallel to X-axis. Even when quantity of output is zero, TFC is Rs 400 and it remains the same throughout.

TVC rises with increase in quantity of output. So, corresponding to each quantity of output TVC is measured along Y-axis and then TVC of each level of output is represented by a point on the graph. For example, point a on TVCC represents TVC of Rs 3,600 when quantity of output is 20 units. Similarly, point b on TVCC represents TVC of Rs 1,296 when quantity of output is 16 units.

TCC is arrived at by joining various points representing TC=(TFC + TVC) at different quantities of output. Take for instance quantity of output as 20 units at which TVC is Rs 3,600 and TFC is Rs 400. Such that TC is Rs 4,000 which is represented by a point a'. Further if quantity of output is 16. units TVC is Rs 1,296 and TFC is Rs 400. Such that TC is Rs 1,696 which is represented by point *b'. Join all such points as a' and 'b' we get TCC. There are 20 points on the TCC just like there were 20 points on TVCC.

Quantity of output
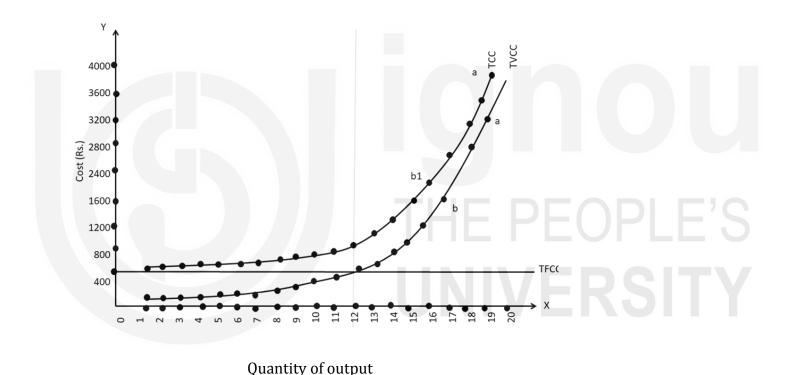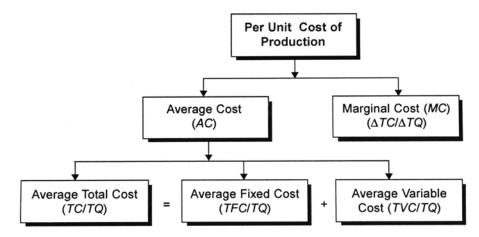
Figure 11.1 :Graphical Representation of Total, Fixed and Variable Cost Curves

11.4.5 Average Total, Average Fixed, Average Variable Cost Curves and Marginal Cost Curve

Data contained in Columns 5, 6, 7 and 8 of Table 11.1 can be represented graphically by drawing average total cost curve (ATCC) average fixed cost curve (AFCC), average variable cost curve (AVCC) and marginal cost curve (MCC) respectively. These curves are represented in Figure 11.2.

In Figure 11.1 TFCC takes the form of a horizontal line because TFC remains fixed for the whole range of output. The TVCC shows that the total variable cost first increases at a decreasing rate and then, at an increasing rate with the increase in output. The rate of increase can be obtained from the slope of TVCC. The reason for the behaviour of AVCC will be analysed in the Section 11.4.6. The vertical distance between TCC and TVC denotes TFC at

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different levels of output. The vertical distance between TCC and TVCC remains the same because TFC remains fixed in the short run, irrespective of level of output.

```
                    ┌─────────────────────┐
                    │   Per Unit Cost of  │
                    │     Production      │
                    └─────────────────────┘
                      │                 │
           ┌──────────────────┐  ┌──────────────────────┐
           │  Average Cost    │  │ Marginal Cost (MC)   │
           │     (AC)         │  │  (ΔTC/ΔTQ)           │
           └──────────────────┘  └──────────────────────┘
            │         │          │
┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│ Average Total Cost│ = │Average Fixed Cost│ + │ Average Variable │
│    (TC/TQ)        │   │    (TFC/TQ)      │   │ Cost (TVC/TQ)    │
└──────────────────┘   └──────────────────┘   └──────────────────┘
```

In Figure 11.2 AFC is shown with the help of AFCC, AFC is shown declining continuously signifying that as quantity of output increases, AFC falls though TFC remains fixed since AFC $= \dfrac{TFC}{Q}$

AVC first falls, reaches a minimum at point 'a', and rises thereafter. When AVC is at its minimum at point 'a', MC equals AVC. ATC first declines, reaches a minimum at point c, and rises thereafter. When ATC is at its minimum at point c, MC equals ATC. Further MC first declines, becomes minimum at point 'b' and rises thereafter. It is already noted that MC equals both AVC and ATC when these are at their minimum.

It is worth noting from the Figure 11.2 that

1) MC curve lies below both AVC curve and ATC curve over the range in which the curves are declining; it lies above them when they are rising.

2) As AFC curve comes nearer to horizontal axis, AVC curve keeps coming nearer to ATC curve. The vertical distance between ATC curve and AVC curve at a given quantity of output represents AFC and since AFC keeps falling with increase in quantity of output, the gap between ATC curve and AVC curve keeps falling. Thus, given ATC curve and AVC curve, the shape of AFC curve can always be deduced.

3) ATC curve can be drawn by joining the points given by the addition of AFC and AVC at different quantities of output.

4) ATC curve is U-shaped signifying that as quantity of output increases in the short run, the average cost keeps falling up to a point c and then begins to rise, and

5) AVC curve and MC curve also show a tendency to fall with increase in quantity of output and finally begin to rise.

Quantity of output
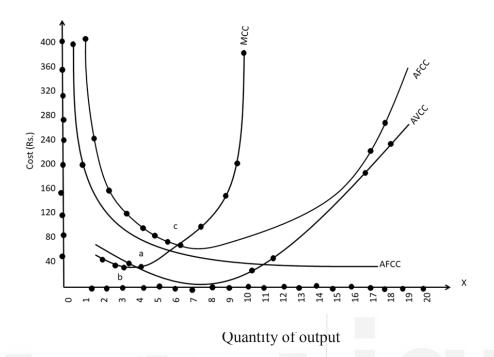
Figure 11.2 :Graphical Representation of Average, Total, Fixed and Variable Cost Curves

The MCC reaches its minimum point at lower level of output than AVCC. For example, MC is lowest at 5 units of output and AVC is lowest at 6 units of output. AC, on the other hand, becomes minimum at 11 units of output.

11.4.6 Shape of Average Variable Cost Curve

It is important to analyse why does AVC first declines and eventually begins to rise? The explanation for this behaviour of AVC lies in the application of the law of variable proportions which is discussed in Unit 9. In a simple way this can be shown as follows.

$$AVC = \frac{TVC}{Q} \qquad (i)$$

(i) TVC is price of a variable factor (P) multiplied by a quantity of variable factor employed (V) such that relation (i) can be represented as

$$AVC = \frac{P(V)}{Q}$$

Or

$$AVC = P\left(\frac{(V)}{Q}\right) \qquad (ii)$$

Quantity produced (Q) divided by amount of variable factor employed (V) gives us average product of variable factor so that

$$AVC = \frac{P(1)}{APv} \qquad\qquad (iii)$$

where APv is average product of variable factor.

Now, we can see as more of a variable factor is employed, average product of variable factor rises, given to us by the law of variable proportions and given the price of the product, $\frac{P(1)}{APv}$ tends to fall. Beyond a point, as APV falls, $\frac{P(1)}{APv}$ rises. Hence, average variable cost APV first falls, becomes minimum and finally rises, giving a U-shaped curve.

11.4.7 Why Short-run Average Cost Curve is U shaped?

Average cost curve is normally U-shaped. The reason for this lies simply in the fact that average cost curve is constituted of average fixed cost curve and average variable cost curve.

Average fixed cost keeps falling throughout with increase in the quantity of output and average variable cost first falls, becomes minimum and then rises. Initially when average variable cost falls, (average fixed cost anyway is also falling,) it leads to a fall in average total cost and, therefore, ATC slopes downwards with increase in quantity of output. Then average variable cost begins to rise but average fixed cost continues to fall and till the rise of AVC is less than fall of AFC, ATC continues to fall. Finally, when the rise in AVC is more than the fall in AFC, ATC begins to rise and thus giving us U-shaped ATC.

MCC is also U-shaped. The reason for this is that given the law of variable proportions, marginal product of variable factor normally first rises, reaches a maximum, and finally declines.

Accordingly, given MC = P(1)/MPv, where MPv is marginal product of variable factor. Marginal cost which is the addition to TC or TVC with addition to one unit of output, first declines, reaches a minimum and rises thereafter. Here, MCC takes the shape of U Curve.

11.4.8 RELATIONSHIP BETWEEN MARGINAL COST (MC) AND AVERAGE COST (AC)

The relationship between marginal cost and average cost is an arithmetic relationship. To understand this relationship let us take a numerical example.

The Table 11.2 shows the marginal costs, total costs and average costs at different levels of output.

Table 11.2: Cost Schedule

Output (Units)	Total cost (Rs.)	Marginal cost (Rs.)	Average cost (Rs.)
(1)	(2)	(3)	(4)
1	60	60	60
2	110	50	55
3	162	52	54
4	216	54	54
5	275	59	55

Column 2 shows the total cost of producing different levels of output.

Column 3 shows the increase in total cost resulting from the production of one more unit of output.

(It is called marginal cost. Thus $MC_n = TC_n - TC_{n-1}$, where n and n-1 are levels of output).

Column 4 shows the average cost at different levels of output: $AC_n = \dfrac{TC_n}{N}$

This table shows that:

1) Average cost falls only when marginal cost is less than average cost. Upto the third unit of output, the marginal cost is less than the average cost and average cost is falling. When 2 units are produced the marginal cost is Rs. 50 which is less than the previous average cost (Rs. 60), now average cost falls from Rs. 60 to Rs. 55. When 3 units are produced, the marginal cost is Rs. 52 which is less than the average cost of 2 units (Rs. 55) so once again the average cost falls from Rs. 55 to Rs. 54.

2) Average cost will be constant when marginal cost is equal to average cost. When 4 units are produced, average cost does not change (It is Rs. 54 when 3 units are produced and remains Rs. 54 when 4 units are produced) because marginal cost (Rs. 54) is equal to average cost (Rs.54).

3) Average cost will rise when marginal cost is greater than average cost. When 5 units are produced average cost rises from Rs. 54 to Rs. 55, because the marginal cost (Rs. 59) is greater than the average cost (Rs. 54).

This relationship between marginal cost and average cost is a generalized relationship and holds good in case of the marginal and average values of any variable, be it revenue or product etc.

In the box a simple proof of the relationship is given: This is for reference only.

Suppose AC falls. Then:

$$\frac{TC_n}{N} < \frac{TC_{n-1}}{n-1}$$

Multiplying both sides by n we get,

$$TC_n < TC_{n-1} \quad x \quad \frac{n}{n-1}$$

$$TC_n < TC_{n-1} \quad \begin{array}{c} x \\ (1+ \end{array} \frac{1}{n-1} \;)$$

$$TC_n < TC_{n-1} \quad + \frac{TC_{n-1}}{n-1}$$

$$TC_n - TC_{n-1} \quad < \frac{TC_{n-1}}{n-1}$$

Since the left hand side is MC, and the right hand side is AC, it proves that

$$MC < AC$$

Thus a fall in average cost means marginal cost is less than average cost. It can similarly be proved that a rise in average cost means, marginal cost is greater than average cost and a constant average cost means marginal cost is equal to average cost.

The relationship between marginal cost and average variable cost is similar to the relationship between marginal cost and average cost because marginal cost is not affected by fixed cost.

Check Your Progress B

1) Distinguish between average fixed cost and average variable cost.

    ……………………………………………………………………………………
    ……………………………………………………………………………………
    ……………………………………………………………………………………
    ……………………………………………………………………………………
    ……………………………………………………………………………………

2) Complete the following table.

    ……………………………………………………………………………………
    ……………………………………………………………………………………
    ……………………………………………………………………………………
    ……………………………………………………………………………………

Units of output	TFC (Rs)	TVC (Rs.)	TC (Rs)	MC (Rs.)
0	100	—	—	—
1	—	—	—	40
2	—	—	—	30
3	—	—	—	50
4	—	—	—	60
5	—	—	—	70

3) State whether the following statements are **True** or **False.**

   i) When marginal cost is minimum average variable cost is equal to marginal cost.

   ii) When marginal cost first begins to fall, average variable cost begins to rise.

   iii) When average product is increasing, average variable cost is falling.

   iv) Average fixed cost remains the same as output rises.

   v) Average fixed cost falls as marginal cost increases.

   vi) Average total cost falls as average variable cost decreases.

   vii) Marginal cost cannot increase when average total cost is falling.

   viii) The gap between ATCC and AVCC falls with rise in quantity of output only in the long run.

   ix) Since ATC=AFC + AVC, therefore, marginal cost is equal to marginal fixed cost plus marginal variable cost.

   x) MC is zero when total cost is maximum.

11.5 LONG RUN COST CURVES

The long run is defined as that period of time in which all factors or inputs are variable. The long run is also that time in future (or planning horizon) when output changes can be planned by the entrepreneur in a manner such that it is most advantageous to him.

In the short run, the entrepreneur has to take the given plant as fixed and can produce more only by using the given plant for more time per day.

In the long run, he can plan even to set up additional productive capacity, keeping the time for which machine runs as unchanged. It would be correct to say that **the long run consists of all possible short run situations among which the entrepreneur or other economic agents may choose.** Most of the planning is normally done in the long run while the actual operation takes place in the short run.

In unit 9, least cost combination of inputs is already explained. We assume that in the long run each alternative output can be produced by the least cost combination of inputs. Given the factor prices, we can find out the cost to be

associated with a given level of output and thus, a long run total cost curve can be arrived. Given the long run total cost curve one can draw long run average cost curve and a long run marginal cost curve.

11.5.1 Long Run Average Cost Curve

In the long run, none of the factors is fixed and all can be varied to expand output. In the short run, the size of plant is fixed and it cannot be changed. In other words, we cannot change the capital equipment in the short run even if size of output is to be changed. In the long run we are permitted to change the size of plants in order to expand or reduce output. Given the least cost combination of output, long run cost curve shows the functional relationship between output and the long run cost of production. **Long run average cost is the long run total cost divided by the quantity of output planned in the long run.**

In order to understand how the long run average cost curve is derived, let us consider two short run average cost curves as shown in Figure 11.3
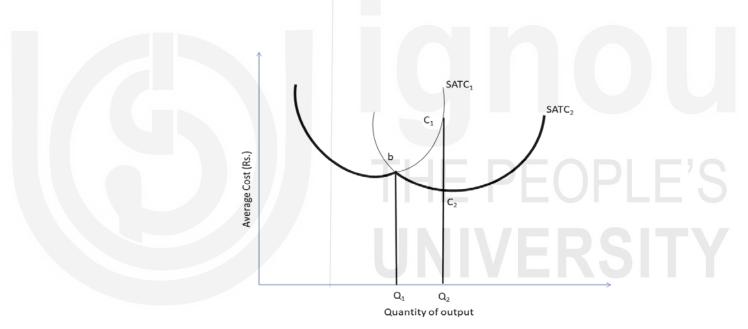
Figure 11.3 :Short Run Average Cost Curve

Two short run average total cost curves are drawn labelled $SATC_1$, and $SATC_2$. These cost curves are also called plant curves. In the short run, the firm can operate only on short run average cost curve, given the size of the plant. We have taken that only these two are the technically possible sizes of plant. Given the short run average cost curve as SATC, the firm will increase or decrease its output by varying the amount of the variable inputs. For example, to produce OQ output in the short run, the firm has no option but to have average short run cost equal to $Q_1.C_1$ as given by $SATC_1$. In the long run, since the firm has a choice to set up a bigger sized plant represented by $SATC_2$, the same OQ, level of output can be produced at Q_1C_2 average cost given by $SATC_2$. In the long run, the firm will examine on which short run average cost it should operate to produce a given level of output at the minimum possible cost. Thus, in the short run the firm's average cost of

production will be $Q_1 C_1$, for OQ_1, level of output and it will get reduced to $Q_1 C_2$ in the long run.

One can easily see from Figure 11.3 that up to OQ_0 level of output, the firm will operate on the short run average cost curve $SATC_1$, though it could also produce with short run average cost curve $SATC_2$, because up to OQ_0 level of output, production on $SATC_1$, gives lower cost than on $SATC_2$. So, upto OQ_0 level of output, smaller plant $SATC_1$, is more economical than the larger plant $SATC_2$. We have shown only two plant case. A multiple plant case can also be easily depicted. The overall conclusion that can be arrived is that in the long run the firm will employ that plant which yields possible minimum unit cost for producing a given level of output. Given the two plant case, shown in Figure 11.3, the long run average cost curve is the curve which is shown by dark line. This long run curve consists of some segments of all the short run average cost curves.

If the size of the plant can be varied by infinitely small amount such that there are infinite number of plants corresponding to which there will be numerous short run average cost curves, then the long run average cost curve will be smooth and continuous. Such a smooth long run average cost curve is shown in Figure 11.4.
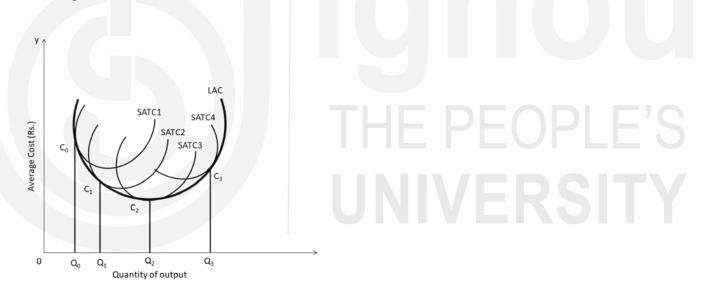
Figure 11.4: Long Run Average Cost Curve

The short run average cost curves are indicated by $SATC_1$, $SATC_2$, $SATC_3$ and $SATC_4$ and the long run average cost curve is shown by dark line. If the firm plans to produce a particular level of output in the long run, it will choose a point on the long run average cost curve corresponding to that level of output and will then plan to build a relevant plant and operate on the corresponding short run average cost curve.

In figure 11.4, it is shown that for producing level of output OQ_0. the corresponding point on the long run average cost curve LAC is C_0 at which $SATC_1$ is tangent to the long run average cost curve. So, if the firm plans to produce OQ_0 output, it will construct a plant corresponding to $SATC_1$ and will operate on this curve at point C_0. If the firm plans to produce level of output OQ_1, correspondent to point C_1 on the long run average cost curve

LAC, $SATC_2$ is tangent to LAC at C_1. Similarly, we can explain points C_2 and C_3 at which OQ_2 and OQ_3 levels of output are planned to be produced respectively. Every point on the long run average cost curve is a tangency point with some short run average cost curve. The long run average cost curve LAC is also called 'envelope' curve since it envelops a set of short run average cost curves.

It can also be seen that larger levels of output can be produced at the lowest cost with the bigger sized plant, whereas smaller levels of output can be produced at the lowest cost with smaller sized plant.

Following observations can be easily made about the long run average cost curves.

1) Every point on the long run average cost curve is a tangency point with some short run average cost curve,

2) The long run average cost curve tangent to the minimum points of all the short run average cost curves,

3) The long run average cost curve is also U-shaped though it is much broader than short run average cost curve,

4) When the long run average cost curve is falling it is tangent to the short run average cost curve at a point left to the minimum point or is tangent to the falling portions of the short run cost curve,

5) When the long run average cost curve is rising, it will be tangent to the short run average cost curve at a point right to the minimum point or is tangent to rising portions of the short run average cost curve, and

6) When the long run average cost curve is a horizontal straight line, it will be tangent to the short run average cost curve at the minimum point of short run average cost curve.

11.5.2 Long Run Marginal Cost Curve

The long run average cost curve gives us the minimum unit cost of producing different levels of output. The long run marginal cost curve, on the other hand, shows the minimum amount by which cost is increased when output is increased or the maximum amount of total cost can be reduced when output is decreased. The relation between short run marginal cost and long run marginal cost is explained with the help of Figure 11.5.
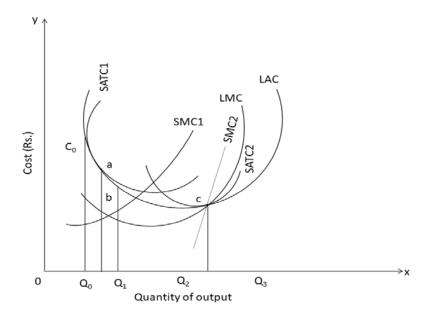
Figure 11.5 :Long Run Marginal Cost Curve

At OQ_o level of output $SATC_1$, and LAC are equal and, therefore, short run total cost is equal to long run total cost. At level of output OQ $SATC_1$, is more than LAC and therefore, short run total cost is greater than long run total cost. As level of output is expanded to OQ_1 from OQ_1 long run marginal cost will be more than short run marginal cost.

The long run marginal cost curve intersects LAC when it is at its minimum point and there will be only one short run average cost curve ($SATC_2$ in Figure 11.5) which coincides with the long run average cost curve at its minimum point. At point C, $SATC_2$, is tangent to LAC and it is also the point at which $SATC_2$ and LAC are minimum. So, long run marginal cost equals short run marginal cost at point c. Hence, long run marginal cost curve passes through the minimum point on LAC. Joining the points like b and c will give long run marginal cost curve. Long run marginal cost curve will also be U-shaped and it will cut the long run average cost curve at its lowest point.

11.5.3 Why Long Run Average Cost Curve is U shaped?

The reasons for U-shaped short run average cost curves are already discussed in section 11.4.7. In unit 9, while explaining the law of increasing and diminishing returns to scale, the concepts of economies and diseconomies of scale were introduced. The same factors, namely, economies of scale (which explain increasing returns to scale) also explains why the long run average cost curve initially slopes downward with increase in the level of output. Similarly, the factors namely diseconomies of scale (which explains diminishing returns to scale) also explain why the long run average cost curve starts sloping upwards eventually with the increase in the level of output. It may be remembered that we have assumed that prices of factors are constant.

Q.1. Which of the following graphs is a correct description of the TFC curve?
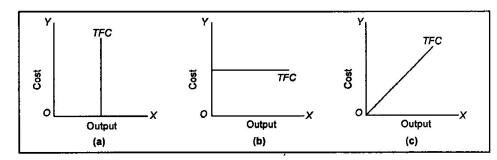
Fig. 1

Ans. Fig.1(b) is a correct description of the TFC curve. It always remains the same at all levels of output.

Q.2. Which of the following graphs represents the correct description of the TC curve?
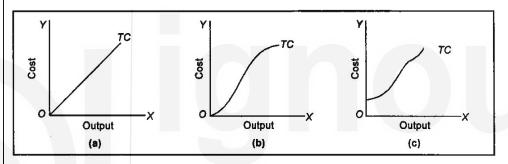
Fig. 2

Ans. Fig.2(c)

Q.3. Which of the following curves correctly represents the average fixed cost curve?
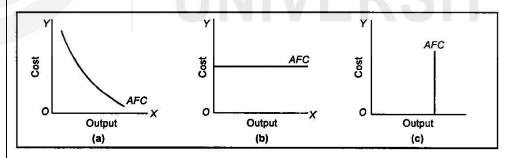

Fig. 3

Ans. Fig.3(a)

Q.4. Can AP curve be rising while MP curve is falling? Show graphically.

Ans. As shown in Fig. 4 the situation is reflected in the range R to S.
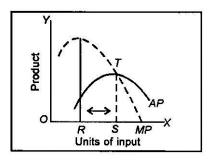
Fig. 4

Q.5. Assume that a production unit is subject to the law of diminishing returns right from the beginning, show graphically the relationship between AP and MP curves.

Ans. The relationship is depicted in Fig. 5 *MP* always lies below the AP curve. *MP* divides the distance between Y-axis and the *AP* curve in two equal parts.

Fig. 5

Q.6. If production is subject to the law of variable proportions, will the total variable cost curve (TVC) be an upward rising straight line?

Ans. No. It would rise initially at decreasing rate and ultimately at an increasing rate, as shown in Fig.

Fig. 6

Q.7. Does the total cost (TC) curve bear any relationship with the total variable cost curve?

Ans. Yes. TC curve rises along with the TVC curve, and always maintains equal distance to TVC curve. The distance represents the total fixed cost at different levels of output, as shown in Fig. 7

Fig. 7

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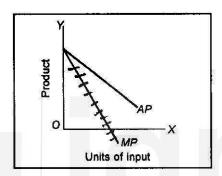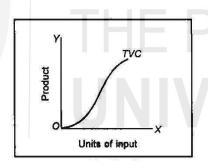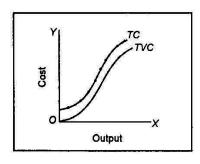
Q.8. Which of the following figures is the correct description of the relationship between AVC and AC?
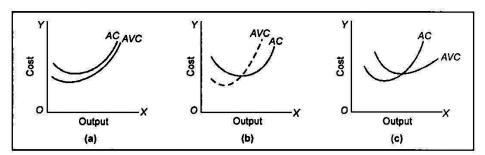
Fig. 8

Ans. Fig. 8 (a)

Q.9. Which of the following figures is the correct description of th»relationship between MC and AVC?
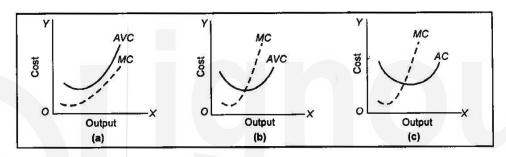

Fig. 9

Ans. Fig. 9 (b)

Q.10. Which of the following figures is the correct description of the relationship between AC and MCI?
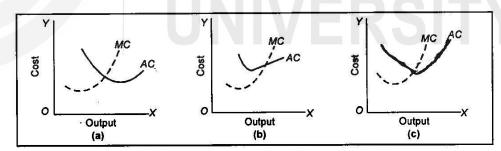

Fig. 10

Ans. Fig. 10 (c)

Q.11. Which of the following figures is the correct description of the relationship between MC and AC?
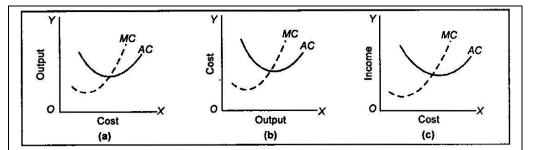
Fig. 11

Ans. Fig. 11 (b)

Q.12. Can MC be rising when AC is falling?
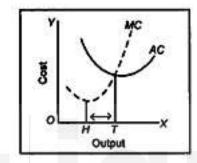
Ans. Yes. HT is the range in Fig.12

Fig. 12

Q.13. Can any short-run cost curve be a horizontal straight line? Show graphically.

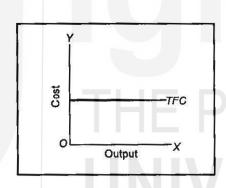**Ans**. Total fixed cost curve is always a horizontal straight line, as shown in Fig.13

Fig. 13

Check Your Progress C

1) Distinguish between long run average cost and short run average cost.

2) State whether the following statements are **True** or **False.**

    i) Long run total cost is constant

    ii) Long run average cost curve is U-shaped

    iii) Long run average cost is the sum of short run average costs.

    iv) Long run marginal cost exceeds short run marginal cost for a decrease in output considering the point where short run average cost equals long run average cost.

    v) The factors which explain U-shaped short run average cost curve also explain U-shaped long run average cost curve.

    vi) Long run average cost curve is always tangent to the short run average cost curves at their minimum points.

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vii) There is no relation between increasing returns to scale and decreasing long run average cost.

viii) Short run average cost curve is less broad U-shaped than long run average cost curve.

11.6   OTHER COSTS

There are some other Costconcept which are required to explain the behaviour of production.

These costs are as follows:

Accounting Costs

These are the costs which an accountant will take into account to find out the cost of production of a commodity or service. These costs consist of the payments and charges made by the entrepreneur to the suppliers of various productive factors like land, labour, capital and raw materials. So, the rent paid for the building hired by the firm, wages paid to the labourers employed, interest paid on the money or capital borrowed for doing business and prices paid for the raw materials, fuel and power used, together will constitute accounting costs. These costs involve payment by the entrepreneur of the firm. The accounting costs or payments which the firm makes to other factor-owners for purchasing or hiring the various factors are also referred to as **Explicit costs.**

Opportunity Costs

The concept of opportunity cost occupies an important place in modern economic analysis. The opportunity cost of producing any commodity, say, wheat is the amount of another commodity say rice, that must be sacrificed in order to use resources to produce wheat, rather than rice. To take another example, the factors which are used for the manufacture of steel frame of a cooler may also be used for the manufacture of steel buckets. Therefore, the opportunity cost of a steel frame of a cooler is the output of steel buckets sacrificed which could have been produced with the same amount of resources that have gone into the making of a steel frame of a cooler.

Two points must be kept in mind while defining opportunity cost.

(1) The opportunity cost of anything is only the next best alternative foregone. The opportunity cost of producing a commodity is not any other alternative commodity that could be produced, with the same factors; it is only the most valuable other good which the same factors could produce, and

(2) The opportunity cost of a good should be viewed as the next best alternative good that could be produced with the same amount of money (or the same money value of the factors).

This qualification of the same amount of money is required, to explain the concept of opportunity cost, because all the factors used in the production of one good may not be the same as are required for the production of the next

best alternative good. For example, a farmer employs land, labour, water, fertilizers, wheat seed etc., for the production of wheat but to produce rice he may require the same factors except the type of seed. Similarly, a producing firm may shift from the production of one product to another without any changes in plant and equipment or its labour but it will require different types of raw materials. Thus, the equivalence of factors in money terms has to be taken to find out the opportunity cost of producing a commodity.

The resources of an economy are scarce and cannot be employed to produce all things simultaneously in sufficient quantity. Therefore, if they are used to produce one thing, they have to be withdrawn from other uses. So, the cost of the one thing is the alternative foregone.

The concept of opportunity cost has a wide application to economic problems. It is applicable to the determination of factor prices. It can also be applied to private consumption and public expenditure. For a student the cost of seeing a movie may be the book whose purchase is foregone by him. For the society, the cost of setting up a gun factory may be the parks and roads which are sacrificed. The opportunity cost also explains the phenomenon of price. Since, there is scarcity of factor services, they are put to alternative uses and the commodities produced with these resources command price. If they were in plenty, there would be no alternatives foregone, no opportunity cost and no price. They are priced because of their opportunity cost.

Some of the limitations of the concept of opportunity cost are as follows:

1. The concept of opportunity cost is not applicable to those factors which are fixed or specific. A specific or fixed factor is one which can be employed only to produce a. specific commodity and has no alternatives and hence its opportunity cost is zero.

2. The concept of opportunity cost assumes perfect mobility of factors. If factors are prevented from moving or are themselves reluctant to move to alternative occupations, then their prices do not reflect opportunity cost.

3. The foregone alternatives are often not clearly ascertainable. For example, a machine once installed has no alternative use and no opportunity cost.

These are some of the limitations of the concept of opportunity cost.

Private Costs

The production of a commodity can be looked from the point of view of an individual entrepreneur or a firm which is trying to maximise profits. **The costs taken into account to find out private profits are termed as private costs.** It includes both explicit and implicit costs. For example, an exporter to produce say 1,000 shirts, buys land, labour, capital and raw materials. Payment made for these constitute explicit cost. At the same time, he invests his time and money which if not invested in export business would have been invested where else. Thesecosts constitute implicit costs. If we add up explicit and implicit cost of producing 1,000 shirts we get private cost. The concept of private cost looks at cost from the point of view of a particular

producer. Private profit may be pure economic private profit or accounting private profit.

The **pure economic private profits** earned by producing a given commodity may be thought of as accounting private profit minus what could be earned in the best alternative use of the time and money employed by the entrepreneur to produce this given commodity. Accounting private profit is equal to revenue earned by the producer by selling the commodity minus explicit costs.

Social Cost

It is a much broader concept as compared to private cost. The social cost is looked from the point of view of the society as a whole rather than an individual producing a commodity. Social cost is found out to get social profits rather than private profits. The production of a commodity or service generates some advantages or disadvantages to other members of the society. These advantages are available free of cost and, therefore, whosoever gets these advantages does not pay anything to the producer who has produced this commodity.

For example, a producer in order to facilitate easier movement of his raw materials and finished products may have constructed a road linking it with the highway. This linking road may be used by others also who will not compensate the producer for the benefit they are enjoying. Similarly, the production of commodity may cause discomfort to others and the producer will not compensate those to whom discomfort has been caused. An example of such discomfort is the smoke generated by a firm which is a cost to the society since people have to spend more on medicines and soaps as smoke acts as a health hazard and at the same time the clothes of people get dirty earlier.

In the first case, when some people get an advantage without paying for it, private cost is more than social cost. On the other hand, in the second case when the production of a commodity causes disadvantage to others without compensating them, private cost is less than social cost. The difference between social cost and private cost arises because of externalities (positive or negative advantages available free of cost).

The social cost is the cost a society incurs when its resources are used to produce a given commodity. The concept of social cost is closely linked with opportunity cost.

The social cost of using given resources to produce a unit of any commodity 1 is the number of units of commodity 2 that must be sacrificed in the process, assuming given resources are used to produce both commodities 1 and 2. The social cost of producing say guns is not the money spent on purchasing factors of production and raw materials required to produce guns. The social cost of producing guns is the civilian goods like bread, butter, automobiles etc., which could have been produced by the resources employed to produce guns. The society must give up some of the civilian goods and services and this foregone production is the appropriate measure of the social

cost of producing guns. It is in this sense, we say that social cost of producing a commodity is nothing but the opportunity cost.

Real Cost

This cost refers to payments which are made to factors of production to compensate for the toil and efforts in rendering their services. For example, real cost is computed in terms of the pain and the discomfort involved for labour when it is engaged in production. Similarly, the abstinence and sacrifice involved in saving and capital accumulation is the real cost of capital.

As a concept real cost should not be ignored but this does not carry much significance in the cost of production of a firm because it is a subjective concept and lacks precision. But to the extent payments for pain and discomfort to labour are wages and interest is paid for abstinence and sacrifice, real costs are incorporated in explicit costs. In reality, real costs seldom equal money expenses of production.

The different concepts of costs given in this section of the unit convey different meanings and each one is employed as a tool to analyse a particular economic problem. The concept of cost which is most important and more often employed by an economist is economic cost. It is concept of the economic cost which will be used to analyse the equilibrium of a firm under perfect competition, monopoly, monopolistic competition and oligopoly.

Check Your Progress D

1) Distinguish between private cost and social cost

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   ………………………………………………………………………………

1) Classify the following into accounting cost, economic cost, opportunity cost and social cost.

   Items

   Classification

   i) Salary paid to manager   ..………………………..

   ii) Wastes of an industry thrown into the river

                                        ………………………………..

   iii) The salary an entrepreneur could have earned by working as a manager in some other firm   …………………………..

   iv) Cost of 10 units of commodity X in terms of 15 units of commodity Y

                                        ………………………………..

11.7 LET US SUM UP

Theory of costs of a producing firm relates total cost to the level of output. Physical conditions of production, price of factors of production and how far efficient use of inputs is made, together determine cost of production of a firm. There are a number of concepts of costs like, accounting costs, economic costs, opportunity costs, private costs, social costs and real costs.

In the short run, costs are divided into two categories, fixed and variable costs. Fixed costs do not vary with output. Variable costs are those which increase with rise in output and fall with reduction in output. Total fixed costs divided by output gives us average fixed cost. Similarly, total variable costs divided by output gives average variable cost.

Total fixed cost + Total Variable Cost = Total cost. Average fixed cost + Average variable cost = Average total cost. Marginal cost is the addition to total cost caused by the addition of one unit of output. Marginal cost is also defined as addition to total variable cost by the addition of one unit of output.

The gap between average total cost curve and average variable cost curve keeps falling with the increase in the level of output signifying that average fixed cost keeps falling with increase in the level of output. Average variable cost first falls, then becomes minimum and finally begins to rise with increase in output. Average total cost curve is normally U-shaped.

In the long run all the factors are variable. The long run average cost curve is derived from short run average cost curves. Different size plants are planned to be set up to achieve different levels of output in the long run. The long run average cost curve is also known as an 'Envelope' curve. Every point on the long run average cost curve is a tangency point with some short run average cost curve.

The long run marginal cost curve shows the minimum amount by which cost is increased when output is increased. It intersects long run average cost curve at its minimum point and there is only one short run average cost curve which coincides with minimum long run average cost.

The long run average cost curve is also U-shaped but it is much broader than short run average cost curve. The long run average cost curve slopes downward initially because of the existence of economies of scale and eventually it starts rising upwards because diseconomies of scale replace economics of scale.

11.8 KEY WORDS

Accounting Costs : The payments and charges made by the entrepreneur to the suppliers of various factors of production.

Average Fixed Cost: Total fixed cost divided by quantity produced.

Average Variable Cost: Total variable cost divided by quantity produced.

Average Total Cost : Total cost divided by quantity produced.

Diseconomies of Scale: The disadvantages in cost incurred by a firm when its own output or scale increases.

Economies of Scale : The advantages in cost enjoyed by a firm when its own output or scale increases.

Economic Costs : The accounting costs along with implicit costs consisting of the normal return on capital and the wages or salary the entrepreneur could have earned had he sold his services to others.

Fixed Cost: The cost incurred to employ fixed factors like machine, plant, etc.

Marginal Cost: It is the addition to total cost caused by the addition of one unit of output.

Opportunity Cost: The amount of another commodity that must be sacrificed in order to use resources released for the production of a given commodity.

Private Cost: The costs taken into account to find out private profits.

Real Cost: The payments which are made to factors of production to compensate for the toil and efforts in rendering their services.

Social Cost : The cost found out to arrive at social profits or the cost borne out by the society as a whole to produce a commodity or service.

Total Cost: The sum of total fixed cost and total variable cost.

Variable Cost: The cost incurred to employ variable factors like unskilled labour, raw material, etc.

11.9   ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

3   i) Economic Costs ii) Zero iii) Explicit Costs + Implicit Costs, iv) Explicit v) Implicit Cost.

Check your progress B

2

TFC	TVC	TC	MC
100	--	100	--
100	40	140	40
100	70	170	30
100	120	220	50
100	180	280	60
100	250	350	70

3   i) False ii) False iii) True iv) False v) True vi) True vii) False viii) False ix) False x) True.

Check your progress C

2) i) False ii) True iii) False iv) True v) False vi) False vii) False, viii) True.

2   i) Accounting Cost ii) Social Cost iii) Economic Cost, iv) Opportunity Cost.

11.10 TERMINAL QUESTIONS

1) Distinguish between the following:

     i)   Fixed and Variable Cost.

     ii)   Short run average cost and Long run average cost.

     iii) Average cost and Marginal cost.

     iv)   Economic costs and Accounting cost.

     v)   Explicit costs and Implicit costs.

     vi)   Private cost and Social cost.

2) Define the concept of Marginal cost. What is the relation between average cost and marginal cost?

3) What is the relation between average cost and marginal cost? Use suitable diagrams.

4) Why is a short run average cost curve U-shaped?

5) Explain the shape of Average variable cost curve.

6) How is the Long run Average cost curve derived from Short run Average cost curves? Use suitable diagrams.

7) What is the relation between Short run marginal cost and Long run marginal cost?

8) Explain the factors responsible for Long run Average cost curve being U-shaped.

> **Note: These questions will help you to understand the unit better. Try to write answers for them. But do not submit your answers to the university for assessment. They are for your practice only.**

BLOCK 4
THEORY OF PRICE

BLOCK 4   THEORY OF PRICE

In Block 3 you have learnt about the production function, law of supply, elasticity of supply and theory of costs. Another important area in Economic Theory relates to the determination of price. In this block, you will learn how a firm determines the level of its output and the price of its product. To be specific, it deals with equilibrium concept and equilibrium under perfect competition, monopoly, monopolistic competition and oligopoly.

Unit12 deals with concept of equilibrium, market and price, and market structures and market equilibrium.

Unit 13 explains concept of perfect competition short-run and long-run equilibrium of a firm and industry under perfect competition.

Unit 14 deals with concept of monopoly, short-run and long-run equilibrium under monopoly, price discrimination and regulation of monopoly.

Unit 15 explains the concept of monopolistic competition and short-run and long-run equilibrium under monopolistic competition.

Unit 16 deals with characteristics of oligopoly, price and output equilibrium in an oligopolistic industry and concentration and collusion of oligopolists.

UNIT 12 EQUILIBRIUM CONCEPT AND CONDITIONS

Structure

12.0   OBJECTIVES

After studying this unit, you should be able to:

* analyze the meaning of equilibrium;

* how equilibrium can be looked at from various angles;

* how in the market it helps to determine equality between supply and demand how and why demand and supply should be expressed through schedules and curves;

* what characteristics determine the structure of a market;

* how a given market structure gets related to demand curve; and

* explain the behaviour of the average and marginal revenues facing the seller in different market conditions.

12.1   INTRODUCTION

In the preceding units, you have learnt how production forces operate in the short and long period and what levels of output could become available to the market under various conditions.

The market brings sellers and buyers together. The price mechanism leads to the determination of equilibrium price which in turn helps in determining the level of production of a commodity and the level of demand. The

remuneration from factors of production and the distribution of income are also decided through the price mechanism in the factor market. For consumers, what quantities of the various commodities they consume and how much of their income they will use up for direct satisfaction of wants and how much they will save, are also decided by price mechanism. Thus, price mechanism determines allocation of resources in the free enterprise system.

A higher price indicates that the quantity supplied is more than quantity demanded at that price. This leads to the tendency of price showing a tendency to fall until supply becomes equal to demand. If price falls below this level the reverse happens namely demand becomes more than supply leading to a tendency of price going up until supply becomes equal to demand. In this unit, you will learn about equilibrium and its various aspects.

12.2   CONCEPT OF EQUILIBRIUM

The term equilibrium is a position where the opposing forces have balanced each other so that the system is either at rest or moving along a steady path. The tendency for the economic force to be in a state of balance should not be taken to mean that they remain in a state of no change. What is suggested by the tendency towards equilibrium is that economic forces will be necessarily generating conditions whereby disequilibrium, if it is there, will have to give way to equilibrium provided the equilibrium is stable. For instance, if quantity demanded of a commodity is less than quantity supplied then the price of those goods will fall and the seller may find himself in a situation where he is making less profit than before or even suffering losses. In such circumstances, he will be forced to reduce his output until it has become equal to quantity demanded. The price will have a tendency to rise if quantity demanded is more than quantity supplied of a commodity. Thus the tendency towards balance between the economic forces is inherent, if the outside forces do not interfere.

12.3   SIGNIFICANCE OF EQUILIBRIUM

It may be noted that the suggestion that there is a tendency for the economic forces to be in equilibrium does not mean that equilibrium is 'good' or 'bad'.

As Lionel Robbins, the British Economist has said "Equilibrium is just equilibrium; there is no penumbra of approbation about it". This means that in itself equilibrium is neither to be admired nor condemned. It is just to be treated as a tendency for the market forces to balance themselves in course of time.

12.4   APPROACHES TO EQUILIBRIUM

It may be pointed out here that the tendency towards balance between economic forces has to be seen in the context of a time-frame. It may be that output is more than the market requirement today but not with reference to a long period. If output is excessive today, an attempt is made to bring that

output in balance with today's market requirement in various ways. But this will not be done instantaneously. For achieving balance in such circumstances, adjustments will have to be made. However, such adjustments are bound to take time. This is not to say that an immediate adjustment of some sort will not be possible. Much will depend upon the organisation of productive forces determining the production of the concerned commodity. Suppose a producer deals in a perishable commodity. Such a producer may be faced with a situation in which output is in excess of the market requirement but he cannot store his commodity because it is perishable. He will, therefore, be forced either with the alternative of selling his output at whatever low price he can get, or destroy his output. If he does the latter he gets zero price which is obviously worse than getting a low price. The producer of the perishable commodity has, therefore, to sell his output at whatever low price is available to him and thus equalize or balance his output with the market requirement. Such an adjustment leading to equilibrium will be almost immediately possible and involves little time. It can be called **'Momentary Equilibrium'.**

However, there are other kinds of goods produced at any given time which are non-perishables. Such goods can be stored or carried over to a subsequent period in case their output is in excess of market requirement. If the market requirement is more than output, it can be possible to a limited extent, to increase the output provided the producer has time to arrange for more rawmaterials, more labour, more electricity, etc. The point being made is that in case some time is available to a producer, production adjustments can be made to enable a balance of the economic forces. If at least so much time is available that he can have more raw material and more labour when quantity demanded is more than quantity supplied then **'Short-term equilibrium'** is possible.

The third adjustment would be one in which fixed capital may have to be changed. If there is excess supply, the fixed capital will have to be reduced. If there is deficient supply, the amount of fixed capital will have to be raised. Such changes in plant and equipment of a factory can be brought about only in a long period and thus a **'Long-term equilibrium'** is possible.

Thus, there will be equilibrium,

i) related to a momentary adjustment process which will be called **Momentary equilibrium;**

ii) there will be equilibrium related to the short period adjustment process in which various inputs, except plant and equipment can be changed, which is called **Short period equilibrium**; and

iii) there will be equilibrium related to adjustment in plant and equipment which will be described as **Long period equilibrium.**

Micro and Macro Equilibrium

We have noted that equilibrium involves balancing of economic forces. However, economic forces are so much spread out that unless we have started looking at them in terms of boundaries, it may not be possible to conceive of

their being in balance meaningfully. In economics, it is, therefore, convenient to talk of economic forces either in Micro or Macro terms. Macro-forces can either be related to national economy or to international economy; micro forces relate to a firm or an industry. It would be easily seen that micro balancing of economic forces enables us to isolate a small area from a large area, from an area relating to one commodity to the one embracing all commodities. Such separation often enables us to suppose either that economic forces at the national or international economy level are static or that even if they are dynamic, they do not affect the micro forces. Such assumptions are made for better understanding of micro economic analysis.

Economic forces in the context of a micro and a macro situation gives us the Micro-equilibrium and Macro-equilibrium respectively. In both micro and macro equilibrium, the short and long term adjustments are quite important. Following this, we can talk of short-term micro-equilibrium, long-term micro-equilibrium, short-term macro-equilibrium and long-term macro-equilibrium.

Static and Dynamic Equilibrium

There is one more point which needs consideration. Analysis of balance between economic forces can be built on the assumption that they are changeable and actually changing over time. It can be built on the assumption that they are what they are and would not change at least within the time for which the balance has to be worked out. Where the analysis of balance between economic forces supposes change in them over time, we say that we are analyzing **dynamic equilibrium.** On the other hand, where the balance is conceived as if the economic forces are unchanging, we are studying **static equilibrium**. For instance, if we suppose the tastes and incomes of the consumers or stocks of capital and labour as given, we would say, we are analyzing static equilibrium. On the other hand, if these variables are changing over time, we would be analyzing dynamic equilibrium.

So, there are various ways of looking at and analyzing equilibrium. We may do that in terms of the time available for adjustment, in terms of boundaries within which the economic forces are supposed to operate and in terms of constancy or variability in the forces.

12.5   WHAT DOES A MARKET MEAN?

You have learnt the meaning of equilibrium; now let us deal with the very common situation in respect of which we analyze equilibrium. This is the situation of a commodity market. Market implies a situation where buyers and sellers of a commodity interact. Market necessarily implies coming together of buyers and sellers of the same or similar commodities. It is possible for sellers to be dealing in one variety of soap and the buyers being interested in another variety which can be substituted for the one which same sellers are selling. Such buyers and sellers will constitute a market. What is to be noted about a market is that it is not necessarily a geographical area. Groups of buyers and sellers can be very widely located from each other. In fact, the more the development of communication and transport facilities, the

easier it would be for buyers and sellers to come to contact with each other even if there are long distances.

In a market there can be just one seller and many buyers and there can be one buyer and many sellers. There can also be many sellers and many buyers just as there can be a few sellers and many buyers or few buyers and a many sellers.

We shall see later that differences which characterize different markets in respect of the number of sellers constituting them can make significant difference to the determination of market equilibrium.

12.6 BASIC CONDITIONS OF EQUILIBRIUM

Generally, in the context of a market, equilibrium means a balance between the economic forces on the sides of sellers as well as buyers. In case we consider commodities, demand and supply will relate to commodities. In case, we consider factors of production, demand and supply will relate to factors of production. We are going to analyze market for commodities and, therefore, the economic forces considered will be those of supply and demand of commodities alone.

When we refer to supply and demand in the context of equilibrium, we are not suggesting the amount of the commodity actually supplied and demanded but something different. In fact, supply in the context of equilibrium is a list or schedule of the various amounts of a commodity which firms or sellers would make available at various possible prices. Likewise, demand will be a list or schedule of the various amounts of a commodity which buyers demand at various possible prices. Thus, supply is not what has been actually sold but a schedule of intended sales at different prices. Similarly, demand is not what has actually been demanded but a schedule of amounts demanded corresponding to various prices. For instance, it is likely that corresponding to a price of say Rs. 4 per unit, the sellers are intending to sell 50,000 loaves of bread but the buyers may be wanting to buy less than 50,000. Similarly, lack of equality between intended sales and purchases can exist at many other prices. However, equilibrium will take place only at a price, say Rs. 3.50, at which, what the sellers are intending to sell is just equal to what the buyers are intending to buy.

Market equilibrium is the balance between the intended sales on the part of the buyers and the sellers respectively. Sellers entering the market anticipate the price which could rule in the market and corresponding to each such anticipated price; they decide the amount of the commodity that they think it will be worthwhile to supply. Thus, behind the supply schedule, there is the consideration that supplying a certain amount of the commodity at a certain price would help in maximization of profits.

Similarly, when buyers decide what they propose to buy at a possible price, they also consider if buying at that price would be worthwhile. Buyers would naturally think of the utility or satisfaction which they would get from buying

a particular amount at a particular price. An equilibrium will mean an equality or balance between the intended sales and intended purchases.

An equilibrium is characterized by absence of the desire to expand or contract supply or demand of the commodity in question. When a supplier decides to expand its supply by one unit, he compares the price of the commodity with the marginal cost.

Marginal cost is defined as the addition to total cost by producing one extra unit of a commodity. Similarly, when a buyer decides to increase the purchase of a commodity, he compares the price of the commodity with the marginal utility.

Marginal utility is the addition to total utility by buying an additional unit of a commodity. Therefore, we can say that absence of expansion or contraction in supply and demand is what market equilibrium necessarily connotes. This implies that the price of the given commodity should be equal to its marginal cost to the supplier on the one hand and its marginal utility to the buyer on the other.

When schedules of intention of sellers and buyers are drawn up, we can show them by curves and just where the demand and supply curves intersect we will have a price at which what the sellers plan to sell is equal to what the buyers plan to buy.

This is what we call equilibrium price. The sellers schedule gives the supply curve and the buyers' schedule gives the demand curve.

Thus, equilibrium in a market can be said to be determined by supply and demand, not the actual amounts supplied or demanded but the whole series of amounts showing the various intentions of sellers and buyers at various prices.

The following Table (12.1) shows schedules of supply and demand:

Table 12.1: Demand and Supply Schedules

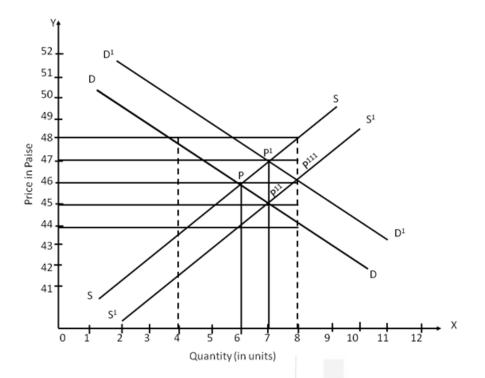| Intended Supply (in Units)	Expected Price (in Paise)	Intended Demand (in Units)
10	50	2
9	49	3
8	48	4
7	47	5
6	46	6
5	45	7
4	44	8
3	43	9
2	42	10
1	41	11

Figure: 12.1: Demand and Supply curve of market

Look at Figure 12.1 where DD is the demand curve and SS is the supply curve. At a price of paise 48 quantity supplied is 8 units and the quantity demanded is 4 units and this leads to a fall in price and it keeps falling until it becomes equal to paise 46 at which quantity supplied and quantity demanded becomes equal to 6 units. Similarly, at a price of paise 44, the quantity demanded is 8 units and the quantity supplied is 4 units which leads to a rise in price and it keeps rising until it becomes equal to paise 46 at which quantity supplied and quantity demanded becomes equal to 6 units. Forty-six paise is thus the equilibrium price or market price of the commodity.

Check Your Progress A

1)   What do you mean by equilibrium?

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2)   Distinguish between micro and macro equilibrium.

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3) What is the difference between static and dynamic equilibrium?

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4) Fill in the blanks with appropriate words given the end of the questions.

 i) The price will have the tendency to rise if quantity demanded is…………than quantity supplied of a commodity.

 ii) Equilibrium related to short period adjustment process is called a …………………

 iii) Analysis of balance between economic forces with changing over time is called....................

 iv) In static equilibrium, economic forces are considered as …………

 v) Market equilibrium is the balance between the intended purchases and……............ on the part of the buyers and the sellers respectively.

12.7 MARKET AND PRICES

Suppose for some reason-because the buyers are earning more income than before or their liking for the commodity has become stronger, they desire to demand more of the commodity at each of the assumed prices than before. Then the demand curve will shift to the right and become D'D'. This new demand curve (Figure 12.1) will intersect the supply curve and the demand curve DD will be P" and the new price will be paise 46. A rise in demand thus raises the price, supply curve remaining unchanged.

Likewise, if for some reason-say, better availability of raw materials—the supplier can supply more of the commodity, at each of the assumed prices, the supply curve will shift to the right and become S'S' Then the new point of intersection between this supply curve and the demand curve DD' will be P' and the new price will be paise 45 which is lower than the old price paise 46. Thus, a rise in supply will lower the price, demand curve remaining unchanged.

It may, however, be noted that while allowing for a shift in the demand curve, we let the supply curve remain the same and while allowing for a shift in the supply curve we let the demand curve remain the same. If both curves shift, we will have to find out the exact degree of shifts in demand curve and supply curve before we can say what will happen to the price. Look at Figure 12.1, where the intersection of the new demand curve and the new supply curve is shown at point P" at which the price is paise 46 and quantity demanded and quantity supplied is 8 units.

Supply and demand could be either of the individual firm or of the industry. The demand curve relevant to a firm will be the horizontal sum of the

individual demand curves of the buyers who demand the commodity produced by the firm. The supply curve of the firm will show amounts of output which the firm considers making available to the group of buyers represented by the demand curve. If an industry is being discussed, the demand curve will show the sum of the demand curves of all the buyers who may be there, no matter from which firm they are buying the commodity. The supply curve for the industry will similarly show the total supply of all the firms constituting the industry at different prices. This difference between the demand and supply curves of firms and industry has been shown in Figures 12.2 and 12.3 respectively.
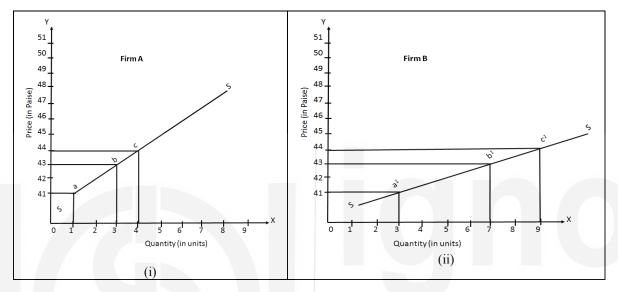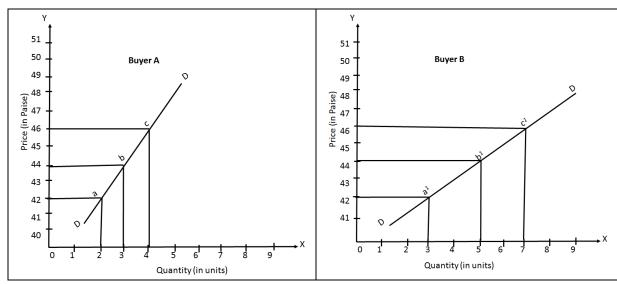
Figure 12.2 : An Industry's Supply Curve

Look at figure 12.2 - where Firm A's and Firm B's supply curves are shown in (i) and (ii) respectively where quantities are measured on X-axis and price (in paise) is measured on Y-axis. Firm B's supply curve is shown flatter than that of Firm A's supply curve. There can be

more firms than A and B in an industry. An industry is a group of firms. The supply curve of an industry is shown in (iii). We notice that point a in (i) shows that at 41 paise price 1 unit is supplied by Firm A. Similarly at point a' firm B supplies 3 units. If the industry consists of Firm A and Firm B alone, the industry's supply at 41 paise price is 1+3=4 which is shown by point a" in (iii).

Similarly, amount supplied by the industry is found but 43 and 44 paise price where the quantities supplied are 10 (=3+7) and 13(=4+9) respectively. If points like a" b" and c" are joined together, we get the industry's supply curve.

Look at Figure 12.3 where Buyer A' and B's demand curves are shown in Figures (i) and (ii) respectively and the industry's demand curve is depicted in Figure (iii). The procedure to derive the industry's demand curves is the same as the industry's supply curve as explained above in Figure 12.2.
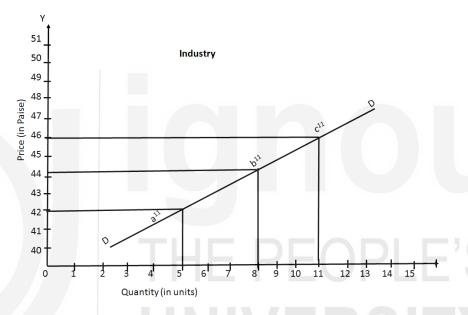
Figure 12.3 : An Industry's Demand Curve

It is inherent in the concept of equilibrium that there is a tendency for the economic forces to balance. This means that if any price in the market is not the equilibrium price, there will be tendency for it to change, so that ultimately the equilibrium price prevails, provided the equilibrium is stable.

Alfred Marshall used the term **'normal price'** for what would be '**equilibrium price in a long period'.** Market price would then either be the actual price prevailing in the market at any given moment of time on the price ruling in a short period. In either case, however, this price will have a tendency to change, because all the adjustments needed for a normal price would not be made except in the long period.

12.8 MARKET STRUCTURE

As market is a combination of buyers and sellers and this combination have several forms, depending on the number of buyers and sellers and some other characteristics. Every form of combination is a distinct kind of market structure. Some other characteristics defining market structure are also (in addition to the number of sellers), taken into account. They are: (i) price

elasticity of demand; (ii) cross elasticity of demand; (iii) nature of the product; and (iv) freedom of entry.

Demand reactions to a change in the price of a commodity vary and that sometimes when sellers raise the price, the buyers may reduce their demand very sharply; also there could be commodities whose demand does not decline even if the price is higher. These two cases-the first of a higher price elasticity of demand and the second of a lower one, are the characteristics which impose limitations on sellers in respect of their capacity to manipulate their price. The more price elastic is the demand of the commodity, the less will be the control which a seller can exercise on the market and the more we will move in the direction of perfect competition. With lower elasticity, we will move in the opposite direction namely, monopoly.

Cross elasticity means that demand for a seller's commodity would vary because of the change in the price of a substitute supplied by another seller. The demand for a tea seller's output could be affected by a change in the price of coffee, since tea and coffee are substitutes. If cross elasticity for tea is high, the tea seller would be helpless to raise his price. But if it is low, manipulation of the price will be possible and we would move from more to less competition.

The third factor, namely, the nature of the product refers to whether the product is homogeneous or differentiated. Homogeneous product implies that all sellers are selling identical product. The differentiated one implies that the product while being basically the same is slightly different from that of the other sellers. Wheat is an example of a homogeneous product while tooth paste is the example of a differentiated one.

If a seller is selling the same product which the other sellers are selling, he may not be able to charge a higher price than the rest so that there will be greater competition amongst sellers. If, however, he is selling a differentiated product say another brand of tooth-paste, he can charge a higher price than the rest without losing the share of the market. To the extent, the seller's control over price increases. We will move towards a situation of less competitive market.

Freedom of entry is crucial to competition. Assume some seller is able, for some reason, to raise his price and profit. Provided entry into industry is free or unhindered, new sellers attracted by high profit, would make going tough for the existing seller and thus competition will increase. If entry is restricted, competition to that extent will also be restricted. Thus in perfect competition, the number of sellers is large, demand is so highly elastic as to be infinite, the cross-elasticity of demand is infinite, the product is homogeneous, entry of firms into the market is free and there is perfect knowledge on the part of buyers and sellers.

In oligopoly, where the number of sellers is small, elasticity of demand and cross elasticity are low, the product can be homogeneous as well as differentiated and entry is easy.

In monopoly, where the elasticity of demand is low, cross elasticity is zero, and the product is homogeneous without a close substitute, there is only one seller and entry of other sellers into the market is blocked.

Except for perfect competition, all the other three market structures namely monopolistic competition, oligopoly and monopoly represent imperfect competition.

In perfect competition, since there are a large number of buyers and sellers, one individual buyer or seller is not in a position to influence the price of the commodity in the market. In other words, the demand curve faced by one individual seller isperfectly price elastic or it is parallel to X-axis as shown in Figure 12.4(i). On the other hand, the demand curve faced by a firm under monopolistic competition or monopoly is the one which slopes downward from left to right as depicted in Figure 12.4(ii)
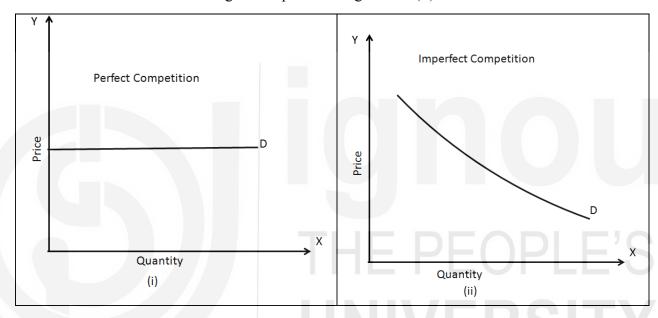
Figure 12.4 : Demand Curve of a Firm

12.9 MARKET STRUCTURE AND REVENUE

The determination of equilibrium in a market requires not only a schedule of supplies and suppliers' prices but also a schedule of demand and buyers' prices. The buyers' price is the average revenue which a supplier would earn by selling a unit of commodity. When the total number of units sold is multiplied by price i.e., by average revenue, we have what is called total revenue. The revenue accruing to a supplier by the sale of an extra unit of his commodity is called marginal revenue. For example a supplier supplying one unit of his commodity, marginal revenue from the sale of say the 2nd unit will be equal to the difference between total revenue from the sale of two units and the sale of one unit. If the price is equal to 50 paise then total revenue from one unit will be 50 paise and that from two units will be 100 paise. Therefore, revenue from the extra unit i.e., the second unit will be 100 paise - (minus) 50 paise i.e., 50 paise. This is marginal revenue. This is shown in Table 12.2.

Table 12.2 Total Revenue, Average Revenue and Marginal Revenue of a Firm under Perfect Competition

(In Paise)

Quantity	AR (Price)	TR	MR
1	50	50	50
2	50	100	50
3	50	150	50
4	50	200	50
5	50	250	50
6	50	300	50
7	50	350	50
8	50	400	50
9	50	450	50
10	50	500	50

The Price or Average Revenue of a firm remains the same in perfect competition because it is only in that market that by varying the supply of a commodity, asupplier is unable to influence the price. The supplies of a firm are an insignificant proportion of total supply and therefore, he has to accept the price as given. He can sell whatever he desires whether more or less at that price but he cannot lower or raise the price. That is why perfect competition is characterized by a horizontal demand curve.

A demand curve shows not only the amounts of commodity buyers are willing to demand, but also the prices at which they want to do so and accordingly, a demand curve is a buyer's price curve also. Further, since the buyer's price is average revenue for the supplier, the demand curve can be called the buyers' price curve as well as the supplier's average revenue curve. Thus, the average revenue curve in a perfectly competitive market is horizontal.
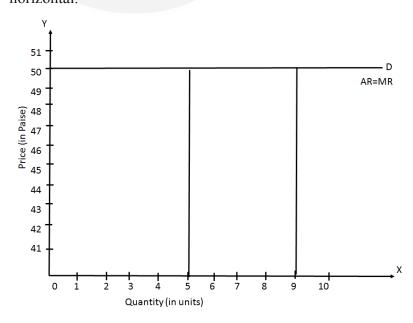

Figure 12.5 : Average Revenue Curve and Marginal Revenue Curve of a Firm under Perfect Competition

Look at Figure 12.5 where since the demand curve D is horizontal, no matter what quantity is demanded and supplied; the price or average revenue will be the same i.e., 50 paise. It can also be seen, as shown in table 12.5 that with an increase in supply, the price, that is, average revenue remains unchanged and marginal revenue will be equal to average revenue. So, in perfect competition, the average revenue curve can also be regarded as representing marginal revenue at various levels of quantities sold.

It has been shown that no single supplier, under perfect competition, will be in a position to influence the price of the commodity, but all sellers together can certainty do that. Thus, it is for an individual firm only that the demand curve is horizontal and not for industry as a whole.

Look at Figure 12.6 where the demand curve for an industry is shown. At supplies Q and Q', we have two different prices -PQ and P'Q'. At higher supply OQ', the price P'Q' is lower than at the lower supply OQ, where the price is PQ. Thus, higher supply can be sold only at a lower price and not a higher price. So, in perfect competition, an industry's demand curve will be sloping downwards while a firm's demand curve will be horizontal.
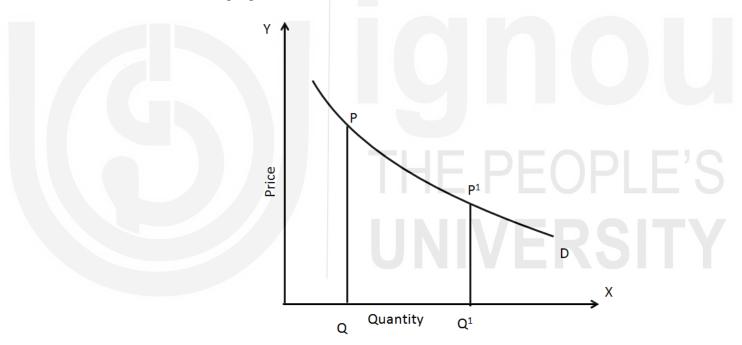

Figure 12.6 : An Industry's Demand Curve under Perfect Competition

Let us analyze the average revenue curve or demand curve of a firm under imperfect competition. The firm will be in a position to influence the price and so, it can be expected to vary its output and charge the price accordingly. It can sell a higher amount at a lower price and lower amount at a higher price because, given the tastes and incomes of the buyers of the commodity, this is the only possibility open to it. Buyers going in for a larger demand will find their marginal utility from the commodity reduced, and, therefore, their price for the larger quantity can only be lower than before. On the other hand, with smaller supplies, buyers finding their marginal utility going up will agree to pay higher price than before. Thus, the average revenue curve of a firm in imperfect competition will be as shown in Figure 12.7.
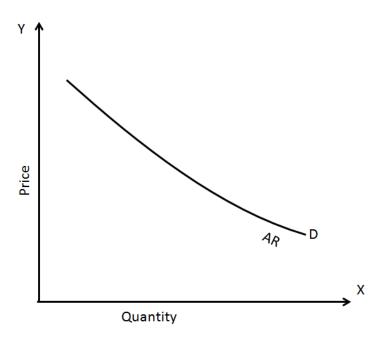
Figure 12.7 : Average Revenue Curve of a Firm under Imperfect Competition

What about marginal revenue? Suppose when the supply is one unit and the price is 50 paise, but as the quantity to be sold increases to 2 units, the price becomes 49 paise. Now marginal revenue, i.e., revenue accruing from the second unit will be the difference between total revenue when 2 units are sold i.e. 98 paise and when 1 unit is sold i.e. 50 paise. The marginal revenue 98-50= 48 paise whereas average, revenue is 49 paise.Thus, when the average revenue declines, marginal revenue becomes lower than the average revenue. Further, as the following table (12.3), willshow, while marginal revenue declines along with average revenue, it does so at a faster rate so that the gap between average and marginal revenue goes on becoming wider with a large output.

Table 12.3: Total Revenue, Average Revenue, and Marginal Revenue of a Firm under Imperfect Competition

Quantity (In Units)	AR (in Paise)	TR (in Paise)	MR (in Paise)
1	50	50	50
2	49	98	48
3	48	144	46
4	47	188	44
5	46	230	42
6	45	270	40
7	44	308	38
8	43	344	36
9	42	378	34
10	41	410	32

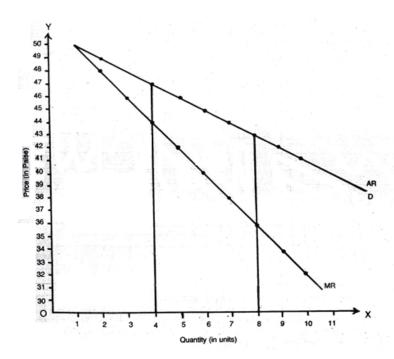The marginal and average revenue curves under imperfect competition are shown in the Figure 12.8

Figure 12.8 : Average Revenue Curve and Marginal Revenue Curve of a Firm Under Imperfect Competition

As quantity increases from 4 units to 8 units, average revenue decreases from 47 to 43paise and marginal revenue decreases from 44 to 36 paise. We can easily see that the gap between average and marginal revenue increases with rise in the level of quantities sold.

Case of Oligopoly One peculiar case of imperfect competition is oligopoly. It is a market situation in which the number of sellers is so small that each seller controls a large part of market demand and can manipulate price but cannot ignore the reactions to a price change by rival firms. Sometimes, the sellers in oligopoly collude to maximise profits by manipulating price. They also try to maximise their sales by non-price competition.

When there is no price-collusion and each tries to set his own price, an interesting situation can emerge. Before considering this situation, we might recall the average revenue curve representing normal conditions of imperfect competition. In such a demand curve, a larger quantity supplied is accompanied by lower average revenue and a smaller quantity supplied by higher average revenue. This is possible because all the sellers in the market agree to sell more at a lower price and less at a higher price and retain their share of the market. No one likes to use the price weapon to push others out. So a typical firm's average and marginal revenue curves will be sloping downwards.

In oligopoly, with price-competition, such a behaviour of curve is disrupted which is shown in Figure 12.9. Suppose at a point of the average revenue curve K, an oligopolist feels like raising his price. Then for every such price increase above K, he may lose a part of his share of the market to other oligopolists, to an extent that in spite of a higher price, he will get lower total revenue. This means that above the point K i.e., at higher prices, an oligopolist's demand curve will show higher elasticity than the usual demand curve. It will, in other words, become flatter. On the other hand, below K,

any attempt by the oligopolist to outsell others by charging a lower price would compel rivals to charge lower price. In this case, he will not be able to increase his share of the market and the situation will be similar to the one of the normal average revenue curve under imperfect competition.
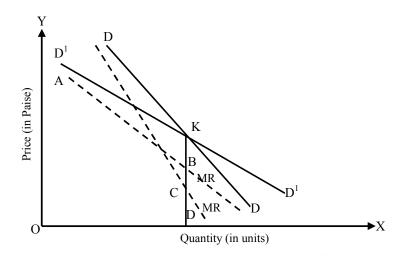

Figure 12.9 : Average Revenue Curve of a Firm under Oligopoly

In Figure 12.9, we see that owing to price competition amongst oligopolists, KD will be demand curve at higher prices upto K and KD will be the demand curve at lower prices after KD^1 is flatter and shows higher elasticity than the old portion of the demand curve KD. However, below K, the demand curve will be as before, namely, KD, The full picture of the demand curve will thus be as shown in Figure 12.10.

It can be seen that this is a picture of the demand curve or average revenue curve which is different from the usual downward sloping demand curve in imperfect competition. The oligopoly demand curve according to some economists tends to be **kinked**, as this one is at point K, which is the point from where the oligopolist attempts to raise or lower his price.
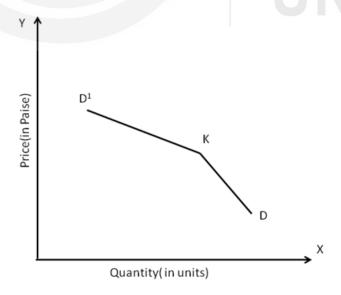

Figure 12.10 : A Demand Curve of a Firm under Oligopoly

Now, if this is the picture of average revenue in oligopoly, how will marginal revenue be shown? Going back to Figure 12.9, we find that we have two

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marginal revenue curves. One is MR^1 corresponding to KD" (i.e., the flatter demand curve) and the other MR corresponding to KD (i.e., the normal demand curve).

Since, we may not have a kinked demand curve in oligopoly the relevant marginal revenue curve will be MR nor MR^1. It will be AB upto K and CD after K when the usual demand curve is relevant. Thus, marginal revenue curve in oligopoly with a kinked demand or average revenue curve will be discontinuous as shown in Figure 12.11
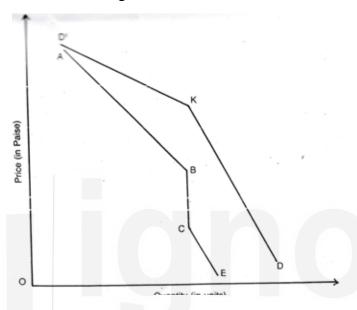

Figure 12.11 : Marginal Revenue Curve of a Firm under Oligopoly

MR curve will be ABCE such that B and C are vertically below K. It may be noted that the marginal revenue curve here is discontinuous. Both average and marginal revenue curves are sloping downwards but both have unusual shapes, if the demand curve is kinked.

BRAIN TEASERS

1. **A firm is contemplating to produce its 10th unit of output, and finds its marginal cost for the 10th unit is Rs. 7.50 and its marginal revenue for the 10th unit equals Rs. 30. What advice would you give to this firm?**

   Ans. A firm would be in equilibrium at the level of output where the *MR = MC*. In this case, since *MC > MR,* the firm would be advised to cut down its output level.

2. **A firm produces output at a constant marginal cost of Rs. 6 and has no fixed costs. The demand curve facing the firm is indicated in table below:**

   (i) Determine the firm's profit-maximising output, price and profit.

   (ii) Show that by producing more or less output the firm would

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decrease its profit.

(iii) Explain what happens to marginal revenue when output is raised from 15 to 20 units.

Price (Rs.)	Quantity Demanded (Units)
12	0
10	5
8	10
6	15
4	20

Ans. (i) Profit-maximising output is one where $MR = MC$. We calculate MR for different levels of output as follows:

At the output level of 10 units, $MR = MC$. Therefore, the firm will produce 10 units; sell it at a price of Rs. 8 per unit. At this level of output $TR = $ Rs.80 and $TC = $ Rs. 60. The firm makes a total profit of Rs. 80 – Rs. 60 = Rs. 20.

(ii) If the firm produces 4 units, it's $TR=$ Rs. 40, $TC = $ Rs. 24. It makes a total profit of Rs. 16. If the firm produces 15 units, it's $TR = $ Rs.90, $TC = $ Rs.90. It makes no profit.

Price (Rs.)	Q	TR	MR	MC	TC
12	0	0	—	—	0
10	4	40	10	6	24
8	10	80	6	6	60
6	15	90	2	6	90
4	20	80	-2	6	120

(iii) MR becomes negative.

3. At the quantity where MR equals MC, the following data apply: $AFC = $ Rs. 8, $AVC = $ Rs. 15, Price = Rs. 20.

Should the firm produce in the short-run or in the long-run?

Ans. The firm should produce in the short-run, since Price $>AVC$.

The firm should not produce in the long-run, since profits are negative.

Check Your Progress B

1) What is the difference between perfect competition, oligopoly and monopoly?

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2) Differentiate between total revenue, average revenue and marginal revenue.

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3) Are the following statements **True** or **False**?

i) Equilibrium is good while disequilibrium is bad.

ii) Long period equilibrium requires no change in plant and equipment.

iii) Suppliers expect a price which is equal to marginal utility of the commodity to him.

iv) Equilibrium necessarily means equality between marginal cost and average cost.

v) Perfect competition is possible only when the number of buyers and sellers is large.

4) Choose the most appropriate answers from the given alternatives.

i) Perfect knowledge is a characteristic of

a) Monopoly

b) Oligopoly

c) Monopolistic competition

d) Perfect competition

ii) If the demand for a commodity rises

a) Price will fall

b) Price will increase

c) Price will remain same

d) Effect on price will depend upon how supply also behaves

iii) Market means

a) a City

b) Group of buyers and sellers

c) a particular locality

d) Group of gathered people

iv) In imperfect competition, marginal revenue is

a) Greater than average revenue

b) Smaller than average revenue

c) Equal to total revenue

d) Equal to average revenue

12.10 LET US SUM UP

In a market, sellers and buyers of commodities try to protect their respective interests. The sellers wanting a price which at least compensates them for their marginal cost of production and buyers want a price which is not higher than themarginal utility of the commodity. The sellers build a supply schedule and supply curve while buyers a demand schedule and demand curve. When the two curves are put together, a price is determined at their point of intersection. This is equilibrium price because what the sellers are willing to supply at this price is equal to what the buyers are willing to demand.

With shifts in the position of these curves, the equilibrium price will change, rising when demand increases, supply remaining the same and falling when supply increases, demand remaining the same. The precise shapes of supply and demand curves will be influenced by the market form or market structure. So far as the demand curve is concerned, it will indicate quantities demanded at various prices. And since price is always equal to average revenue, the demand curve can be considered to be the average revenue curve (i.e., the revenue which will accrue to the seller from the sale of an average unit of this commodity).

In perfect competition, average revenue will be depicted by a horizontal straight line. In imperfect competition, average revenue will fall as the quantity supplied becomes larger. As for marginal revenue in perfect competition is concerned, it will be the same as average revenue so that the same curve will be the demand curve, price curve, average revenue curve, and marginal revenue curve. In imperfect competition, this will not be so because marginal revenue will be lower than the average revenue and it will fall at a rate faster than average revenue. While demand curve, price curve and average curve will be different. If average revenue slopes downward, marginal revenue curve will also slope downward but it will be steeper than average revenue curve. In the case of oligopoly, a firm's average revenue curve will be kinked.

12.11 KEY WORDS

Average Cost: The total cost divided by the number of units of the commodity produced.

Average Revenue: Total revenue divided by the number of units of the commodity sold. It is the same thing as the price of the commodity.

Dynamic Equilibrium: Where the forces operating on an economic unit balance but remain changing with time.

Equilibrium: Balance between forces operating upon an economic unit at a given time.

Equilibrium Price: That price of a commodity at which the quantity which the sellers are willing to sell is equal to the quantity which the buyers are willing to buy.

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Imperfect Competition: The market situation in which the seller can exercise control over his price.

Long Period Equilibrium: A balance between forces operating upon an economic unit as can be achieved by changing plant and equipment.

Macro Equilibrium: Equilibrium concerning the entire economy of a country including its relations with the rest of the world.

Marginal Cost: The amount by which total cost of a commodity rises when an extra unit of the commodity is produced.

Marginal Revenue: The amount by which total revenue rises when an extra unit of the commodity is sold.

Micro Equilibrium: Equilibrium relating to a small part of an economy likesay, equilibrium in the market for a single commodity.

Momentary Equilibrium: A balance between the forces operating upon an economic unit as can be achieved without a change in output (i.e., by just varying flows from a given stock of the commodity).

Monopolistic Competition: That market in which the seller is able to influence the price not because he sells a significant part of the output but because of product differentiation.

Monopoly: That market situation in which there is a single seller.

Oligopoly: The market situation in which the sellers are so few that each can control and influence the price of the commodity.

Perfect Competition: That state of the market in which the individual firm or seller has no control over the price of his commodity.

Short Period Equilibrium: A balance between forces operating upon an economic unit as can be achieved by changing output but without change in plant and equipment.

Static Equilibrium: Where the forces operating on an economic unit balance but remain unchanged throughout.

12.12 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress A

4   i) more   ii) short period equilibrium   iii) dynamic equilibrium

    iv) unchanging   v) intended sales.

Check Your Progress B

3   i) False   ii) False   iii) False   iv) False   v) True

4   i) d   ii) d   iii) b   iv) b

12.13 TERMINAL QUESTIONS

1) What does equilibrium mean? What is the relevance of time to equilibrium?

2) What is a market? Explain market equilibrium of a commodity diagrammatically.

3) What are the characteristics that have to be considered while identifying a Market structure?

4) Explain the marginal and average revenues of a firm in both perfect and imperfect competition.

5) Explain the nature of Average Revenue Curve and Marginal Revenue Curve of a firm under Oligopoly.

Note: These questions will help you to understand the unit better. Try to write answers for them. But do not send your answers to the University. These are for your practice only.

UNIT 13　PERFECT COMPETITION

Structure

13.0　OBJECTIVES

After studying this unit, you should be able to:

- specify the characteristics of perfect competition

- explain the difference between marginal cost and average cost

- indicate how the marginal and average cost curves should be drawn

- explain why average and marginal costs are equal when average cost is minimum

- explain what is the shape of the marginal cost curve in the short period and where

- a competitive firm's equilibrium is determined .

- distinguish between short and long period cost curves

- differentiate between a firm's short period equilibrium and long period equilibrium

- explain how demand and supply curves relating to a competitive industry are drawn.

13.1　INTRODUCTION

In Unit 12 you have learnt the concept of equilibrium and how it was determined in a market. Demand and supply need to be understood in the context of specific markets if we have to understand fully their significance for price determination. For equilibrium, we need to know a firm's marginal cost besides its marginal revenue. The way a firm's marginal cost behaves with increase in output in the short period; depends on the operation of laws

of variable proportion. Similarly, the behaviour of marginal cost of a firm, in the long period, with increase in output, depends on the operation of laws of returns to scale. **A firm's equilibrium is determined at a point where its marginal revenue is equal to marginal cost.**

In this unit, you will learn about the equilibrium of a firm in the short as well as long period. You will also know the problems which arise while determining an industry's equilibrium under perfect competition in the short as well as the long period.

13.2 CHARACTERISTICS OF PERFECT COMPETITION

Let us study the equilibrium of a firm under perfect competition. **Perfect competitive market is characterized by the existence of a large number of sellers such that one single seller sells an insignificant proportion of the total supply of the commodity**. It is obvious that when a seller controls such a small part of the market, he cannot influence the price that exists in the market. All he can do is to sell whatever he wants to at the price which is already prevalent. Thus, in perfect competition, there is no determination of equilibrium price for a firm. What the firm can do is to take the ruling price as given and decide its level of output with a view to maximise its profits (total revenue-total cost). The profits get maximised at the level of output where marginal revenue is equal to marginal cost.

For perfect competition to exist, the other conditions which must be satisfied are as follows:

1) The commodity produced by different firms of an industry should be homogeneous i.e., the size and quality of product produced should be the same.

2) There should be free entry and exit i.e., any firm which wants to leave the industry can do so without any restrictions. Similarly, if a new firm wants to join the industry, it can also do so.

3) There should be perfect knowledge of the market on the part of sellers such that only one price prevails in the market.

4) There should be no transport cost such that a buyer can buy from any part of the market without spending any money by way of transport.

Given perfect competition under which a firm takes the price, determined for an industry, the demand curve for a firm would be horizontal to x-axis as shown in Figure 13.1.
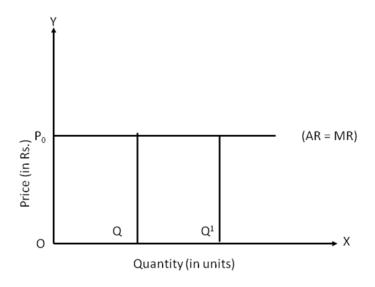
Figure 13.1: Demand Curve of a Firm under Perfect Competition

On x-axis is measured quantity in units and on y-axis price in rupees. At a price of OPo the quantity demanded can be OQ or OQ'.

Since in perfect competition, a firm is helpless to influence the price of the commodity, it is rightly treated as being a **price-taker rather than a price-maker** and it faces a horizontal demand curve. A horizontal demand curve faced by a firm under perfect competition can also be referred to as its average revenue curve as well as marginal revenue curve.

Along with perfect competition, economists sometimes talk **of pure competition** as well. They do so because they think that the latter is more realistic than the former which is almost impossible to come across in actual life. For **pure competition**, they postulate the following three conditions:

i)   Number of firms are very large

ii)   Product is homogeneous

iii) There is free entry and exit of firms in the market.

The demand curve in both perfect as well as pure competitive markets is considered horizontal for a single firm. How much a firm will produce, given the price, will depend upon the behaviour of average and marginal cost of a firm with variation in quantity produced given average and marginal revenues. **The equilibrium of a firm is given at a point where its marginal revenue is equal to marginal cost because it is only at this point that profits of a firm get maximized.**

13.3   A FIRM'S SHORT PERIOD EQUILIBRIUM UNDER PERFECT COMPETITION

To understand the equilibrium of a firm under perfect competition, in the short period, it is essential to study the behaviour of average cost and marginal cost with increase in the level of output in the short period when the size of the plant is unchanged.

How will the marginal cost curve behave in the short period? This would depend upon the particular law of production in operation at that time. If law of increasing returns operates marginal cost would fall; if law of constant returns operate it is constant, and when the law of diminishing returns operates, it rises. Since all factors of production in the short period are not variable, marginal cost will be falling at first and rising afterwards. It will be falling first because of the indivisibility of the fixed factors and rising afterwards because of excessive use of the fixed factor. In the beginning, given the capacity of a machine, as more variable factor say, labour is engaged, every additional labourer gives a higher productivity and, therefore, cost on account of the variable factor falls. After the machine has crossed its optimum capacity the opposite happens. Thus, the marginal cost curve has been shown in Figure 13.2.
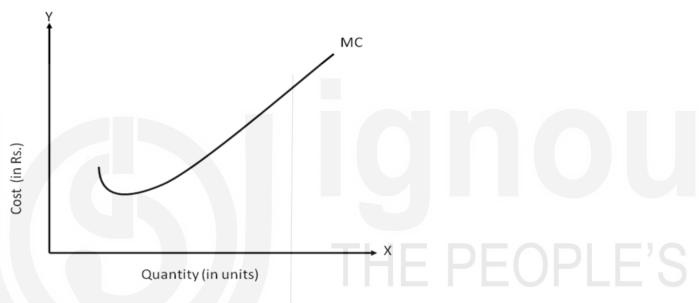

Figure 13.2: Marginal Cost Curve of a Firm under Short Period

Average cost can be divided into three components. Component one shows average fixed cost, component two shows average variable cost and component three shows average total cost consisting of average fixed cost plus average variable cost. So far as the average fixed cost is concerned, it necessarily falls downward with more output because average fixed cost is equal to total fixed cost divided by output. Since total fixed cost is fixed in the short period by definition, the increase in level of output reduces average fixed cost. As more production takes place, average fixed cost declines and when a very large output is sought to be obtained from a given total fixed cost, fixed cost of

> **FOR MORE CLARITY!**
>
> The Average Cost is the per unit cost of production obtained by dividing the total cost (TC) by the total output (Q). By per unit cost of production, we mean that all the fixed and variable cost is taken into the consideration for calculating the average cost. Thus, it is also called as Per Unit Total Cost.

producing an average unit of the commodity will be very low and tends to reach zero. Look at Figure 13.3 where the average fixed cost curve has been shown.

The behaviour of the average total cost will depend upon the marginal cost, which represents the variable cost. Since marginal cost declines in the

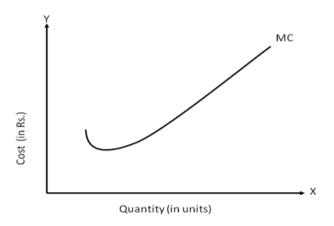beginning but rises later, the average total cost of a firm will also first fall and then rise.

Figure 13.3: Average Fixed Cost Curve of a Firm

Marginal cost is the cost of producing an extra unit and it also gives the rate at which the total cost would change with rise in output. If the cost of the extra unit falls, it implies that the average cost of earlier units was higher. Whenever marginal cost is falling (this will happen under increasing returns) the average cost will be higher than marginal cost. However, the average cost (while being higher than the marginal cost) will also be falling, because with the decline in marginal cost, the average cost should also decline.

In case a firm is experiencing diminishing marginal returns and the marginal cost of production is rising, then marginal cost would be more than the average cost of the earlier units. Hence, the marginal cost will be higher than the average cost. So under diminishing returns, average cost curve while being below the marginal cost curve would rise with a rising output. Look at Figure 13.4 where average fixed cost, average variable cost, average total cost and marginal cost of a firm in the short period have been shown.
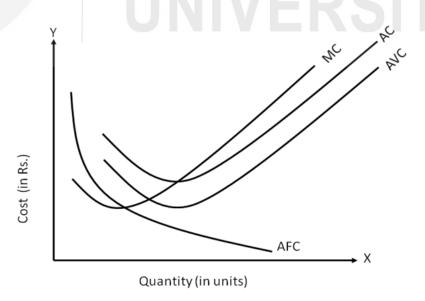

Figure 13.4: Average Variable Cost Curve, Average Total Cost Curve and Marginal Cost Curve of a Firm

It is clear from Figure 13.4 that marginal and average cost curve first fall and then rise and further marginal cost curve necessarily passes through the

minimum point of the average cost curve. Why should this be so? The answer lies in the fact that as we move from a situation of increasing returns to that of diminishing returns, we have the operation of constant returns when marginal and average costs are equal to each other. It is also worth noting that the gap between AC and AVC is getting reduced signifying the fall in average fixed cost with increase in output. Marginal cost curve passes through the minimum point of average variable cost curve as well as average cost curve.

The points at which MC curve cuts the AVC and AC cost curve help us to identify shut-down point and break-even point of a firm respectively. This is shown in Figure 13.5
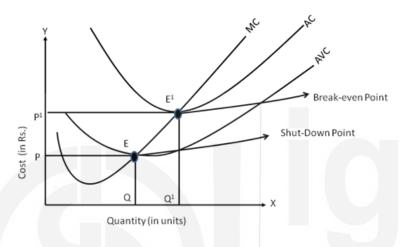

Figure 13.5: Shut-down Price and Break-Even Price of a Firm

The minimum point of the average variable cost curve E indicates the minimum compensation a firm must get in order not to be compelled to shut-down its establishment. In the figure, OP price is just able to cover average variable cost and total revenue will be OQEP which is also the total variable cost. If price falls below OP, total variable cost remains OQEP but total revenue will be less than OQEP. Thus, the firm will not be able to cover even its total variable cost at a price less than OP and therefore will be compelled to shut-down its establishment. The firm can forego its fixed cost in the short period but not its variable cost. It is because of this reason that variable cost is referred to as **Prime Cost** and fixed cost as **Supplementary Cost.** The minimum average variable cost constitutes the shut-down point of a firm.

In case, the price of the commodity equals the minimum average cost say OP', the total revenue accruing to the firm is OQE'P' which is equal to total cost. At price OP' total revenue is equal to total cost and the firm will be able to cover normal profits which are included in total cost. The firm will be able to cover its fixed as well as variable cost including normal profits. In case, price is higher than the average cost viz., OP' the firm will be able to make abnormal profits. This will help the firm to take its output beyond break-even point. But in the long period it will not remain a sustainable position, since other firms finding that abnormal profits are being made, will jump into the market. This will help in raising the total supply which in turn will bring down the price and make the abnormal profit disappear. What is being suggested is that just **as the minimum point of the average variable cost**

curve is the shut-down point for the firm, the minimum point of the average cost curve is the break-even point. It is possible for a firm in the short period to be anywhere above the shut-down point but it cannot afford to operate below the shut-down point.

The decision to vary the output on the part of the firm depends on whether the additional unit of output adds to total profits (i.e., total revenue minus total cost). The cost of an additional unit of output is marginal cost and the revenue from it is marginal revenue. If marginal cost is more than marginal revenue, the additional unit of output implies fall of total profits and the firm will contract its output. If marginal cost is less than marginal revenue, the additional unit will add to total profits and the firm will expand its output.

A firm's equilibrium is possible only when its marginal cost is equal to marginal revenue and at that point total profits will get maximized and the firm needs neither to expand nor contract its output. Thus, if the firm stops production earlier than a point where marginal revenue equals marginal cost, it foregoes some profits that it would have earned by more production. If it raises production beyond that point it finds its total profits reduced. In other words, **a firm's total profit can be maximum only at output at which marginal cost equals marginal revenue.**
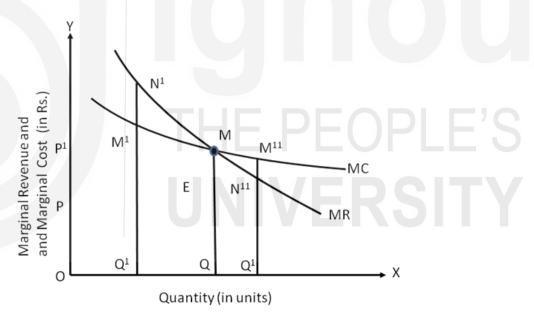

Figure 13.6: Stable Equilibrium of a Firm

The equality of marginal revenue with the marginal cost of a firm is referred to as a necessary condition of equilibrium. The sufficient condition of equilibrium is what is also known as stability condition. If a firm finds it profitable to expand its output beyond the point where marginal revenue is equal to marginal cost, then initially the equilibrium must have been unstable. A situation of unstable equilibrium implies that the equality between marginal cost and marginal revenue does not assure that the firm remains disinclined to expand its output. Thus, it is not always true that if marginal cost and marginal revenue are equal, equilibrium achieved will be stable. If marginal cost curve cuts the marginal revenue curve from above, the equilibrium is not stable. On the other hand, if the marginal cost curve cuts

the marginal revenue curve from below, it is a case of stable equilibrium. Therefore, we can say that while equality between marginal cost and marginal revenue is a necessary condition for equilibrium, it is not sufficient condition for equilibrium. The sufficient condition for equilibrium is that the marginal cost curve cuts the marginal revenue curve from below. This has been shown in Figures 13.6 and 13.7.
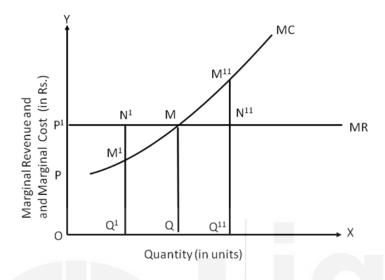

Figure 13.7: Stable Equilibrium of a Firm

Look at Figures 13.6 and 13.7 where marginal revenue is equal to marginal cost at point M and MC curve cuts MR curve from below, such that the equilibrium level of output is OQ. The expanding output beyond OQ will be unprofitable and producing less than OQ will result in a situation of non-maximization of total profits. Hence, point M represents stable equilibrium.

The equilibrium of a firm in the short period under perfect competition can be studied now once the necessary and sufficient conditions of equilibrium have been introduced. It has already been explained that a firm's equilibrium could be either at the shut-down point or anywhere above it in the short period. This gives various possibilities of short period equilibrium of a firm under perfect competition.
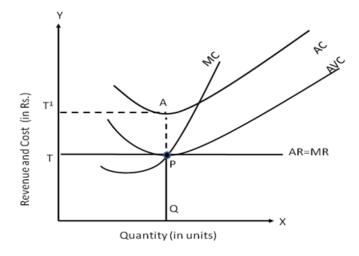
Equilibrium at Shut-down Point

Figure 13.8: A Firm's Equilibrium at Shut-down Point under Perfect Competition

Look at Figure 13.8 where P is the shut-down point. If the AR curve, a horizontal line under perfect competition passes through P, the output OQ will enable the firm to charge the prevalent price PQ. The firm will get the minimum average variable cost which is PQ so that the firm will forego its fixed cost only, but recover its variable cost in full. Further price (or average revenue) will be equal to marginal revenue. If average variable cost is minimum, marginal cost would be equal to average variable cost at P, marginal cost will be equal to marginal revenue also. At P the marginal cost curve is cutting the marginal revenue curve from below. Therefore, equilibrium is stable.

This equilibrium will not last long because at OQ output while the price is only PQ, the average cost is AQ so that OQ multiplied by AQ i.e., total cost is more than OQ multiplied by PQ i.e., total revenue. The total loss of the firm will be TP (=OQ) multiplied by AP which is equal to 'IPAT'.

Figure 13.9: A Firm's Equilibrium at Break-even Point under Perfect Competition

Look at Figure 13.9 where P is the break-even point since with OQ output and PQ average cost, the firm's total cost is OQPT which is also equal to total revenue. Once again price and marginal revenue are the same. Further Price=AR=MR=MC=AC. The firm makes only normal profits which are included in average cost. There are no super-normal profits. MC curve cuts MR curve from below and hence the equilibrium is stable.

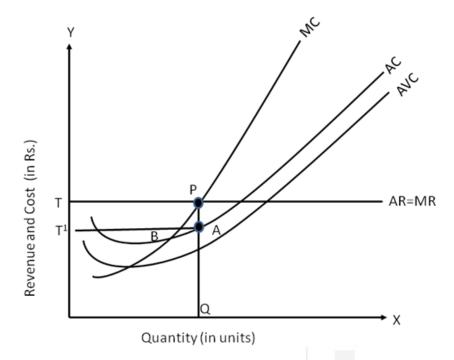**Equilibrium at a Point above the Break-even Point**

Figure 13.10: A Firm's Equilibrium above Break-even Point under Perfect Competition

Look at Figure 13.10 where P lies above the break-even point B. And PQ is the price which is equal to marginal revenue but is also equal to marginal cost. However, the average cost corresponding to OQ is AQ which is lower than the price. Therefore, PQ ×OQ i.e., the total revenue equal to OQAT[1]. The firm is making abnormal profits equal to T[1]APT.

Hence, short period equilibrium of a firm can be characterised by loss at the shut-down point, or no-profit no-loss (with only normal profit) as at the break-even point or abnormal profits as at points above the break-even point. The firm's equilibrium will be determined by the position of the AR curve and MC curve. In between shut-down point and the break-even point, the firm's equilibrium will invariably be characterised by loss rather than by abnormal profits.

13.4   A FIRM'S LONG PERIOD EQUILIBRIUMUNDER PERFECT COMPETITION

While discussing the long period equilibrium of a firm under perfect competition, an important point to remember is that the cost curves relevant for equilibrium will be the long period average and marginal cost curves.

How do we come to these long period curves of the firm? The long period is

> **FOR MORE CLARITY!**
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> Perfect competition is a type of market structure where products are homogenous and there are many buyers and sellers. It is held as the ideal market structure for economies to operate in. Whilst perfect competition does not precisely exist, examples include the likes of agriculture, foreign exchange, and online shopping.

made up of short periods, their number depending on the time taken to make adjustments in plant and equipment in relation to changes in the demand for

the commodity. We can construct long period cost curves only by carefully considering the short period cost curves that a firm has gone through. We take certain specific portions of each of the short period average cost curves corresponding to shifts in the plant and equipment of the firm from one short period to another and join them to arrive at long period average cost curve.

The distinction between fixed cost and variable cost is no longer relevant since all costs are variable costs in the long period. The long period average cost curve is also U-shaped but it is much broader than a short period average cost curve. Given the long period average cost curve, we can derive long period marginal cost curve, given the average and marginal revenue.

A long period marginal cost curve passes through the minimum point of the long period average cost curve such that long period marginal cost will be equal to the long period average cost at that point. The long period equilibrium of a firm under perfect competition is shown in Figure 13.11.
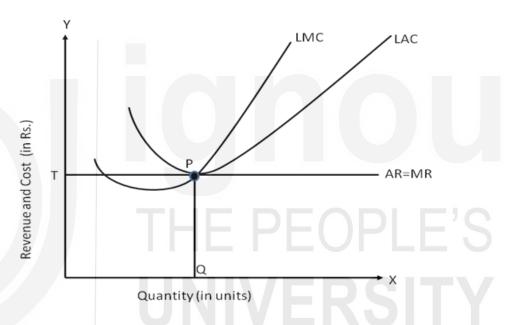
Figure 13.11: A Firm's Equilibrium in the Long Period under Perfect Competition

An average and marginal cost curves are based on a long period in which plant and equipment has also been allowed to be varied from one short period to another. The equilibrium of a firm has to be one which leaves no room for desire for a further adjustment to demand conditions. At the point of equilibrium P/AC = AR = MR = MC and the firm is making only normal profits. Any attempt on the part of a firm to earn more than normal profits will result in new firms entering an industry which will force the firm to again enjoy only normal profits. Similarly, a firm in the long period, under perfect competition, cannot undergo loss because some of the existing firms will quit the industry.

Check Your Progress A

1) What do you mean by the equilibrium of a firm under perfect competition?

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2) Distinguish between short period and long period equilibrium of a firm under perfect competition.

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3) State whether the following statements are **True** or **False.**

   i)   A firm's equilibrium is determined at a point where its marginal revenue is equal to marginal cost.

   ii) Marginal cost curve passes through the minimum point of average variable cost as well as average cost curve.

   iii) The minimum point of average variable cost curve is the shut-down point for the firm.

   iv) A firm's profit can be maximum only at output at which marginal cost is more than marginal revenue.

   v)   A long period marginal cost curve passes through the minimum point of long period average cost curve.

13.5 AN INDUSTRY'S EQUILIBRIUM UNDERPERFECT COMPETITION-SHORT PERIOD

Like a firm's equilibrium, an industry's equilibrium can also be determined with the help of the forces of demand and supply. An industry's equilibrium can be analyzed in the short as well as long period.

The demand and supply curves of an industry are merely aggregates of demand and supply curves relating to the various firms comprising an industry. Look at Figure 13.12(i) and Figure 13.12(ü) where these relationships have been shown.
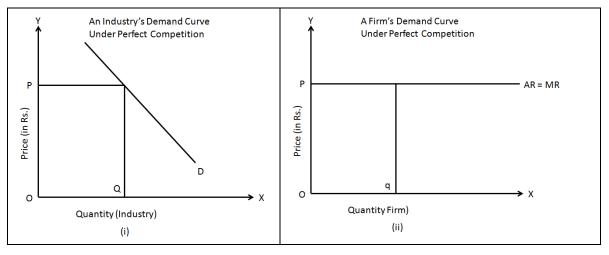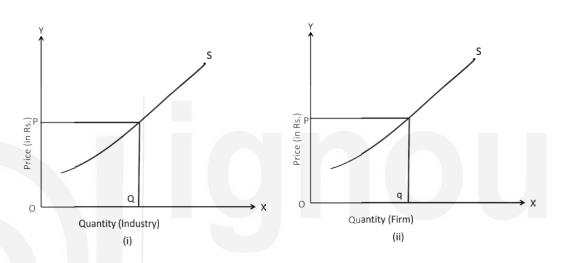

Figure 13.12: Relationship between demand and supply curves relating to various firms

The amount OQ and the demand curve for the industry is the sum total of quantities at given prices shown in the curves of various firms one of which is drawn in the diagram (Figure 13.12 (ü)] above. Quantities like Oq could be read from the demand curves of other firms not shown here and added to give an industry's demand at price OP. At other prices also, quantity demanded could be aggregated to give other points of an industry's demand curve.

The same method would be used to derive the supply curve of the industry. Look at Figures 13.13(i) and (ii) which indicate, OQ supply at OP price is made up of Oq supply coming from the firm represented in Figure 13.13(ii) plus the supplies of all other firms not shown here, at the same price.

Figure 13.13:Supply curve of a firm and supply curve of an industry

It may be remembered that distances in the two diagrams are not identical because these are differences in scales applied to the two curves.

Thus a typical short period equilibrium price of an industry can be determined by the construction of the supply and demand curves of an industry. Look at Figure 13.14
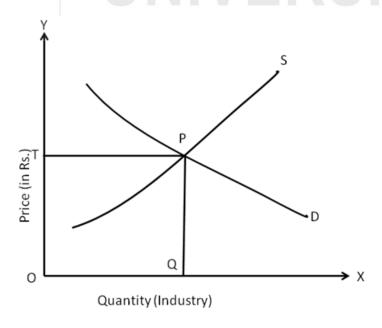

Figure 13.14 : Short Period Equilibrium of an industry

which shows the demand curve and supply curve of an industry intersecting at a point P. OT is the market price at which OQ is the quantity demanded as well as quantity supplied. Any price more than or less than OT will generate forces which will force the price to come back to equilibrium where quantity demanded is equal to quantity supplied.

The firms in the short period will have various situations some of which may be enjoying abnormal profits, some losses and some may be just at the break-even points. But what will be the tendency for the industry as a whole and how will it reach equilibrium?

In the case of the individual firm, it is the marginal cost of that firm which is crucial to the determination of its equilibrium. In the case of the industry, it is the marginal firm whose behaviour will determine the position of the equilibrium in the short period.

A marginal firm is supposed to be the firm which has the highest marginal cost or it is the most inefficient firm in the industry. In the short period, this firm may either make profits or suffer losses. If the marginal firm is making profits despite its having the highest marginal cost, other firms will be making still greater profits and expand output. Therefore, the total supply of output in the industry will expand tending to bring down the price and to reduce the profitability of the marginal firm. As long as the marginal firm makes any profit whatsoever, temptation for other firms to expand output and to raise the total supply will be unavoidable, until the marginal firm makes no profit. Opposite of this will happen when the marginal firm suffers losses. In that case, some non-marginal firms which may not be having as high marginal cost as the marginal firm may still be suffering losses and therefore contract output and thus reducing the total supply of output and resulting in rise in price of the commodity. The rise in price will reduce the loss of the marginal firm. It is only when the losses have completely disappeared that the tendency for some firms to contract output will stop and it is only then that the industry will be in short period equilibrium. It is to be noted that the number of firms in an industry remains fixed in the short period.

13.6   THE LONG-RUN COMPETITIVE INDUSTRY'S SUPPLY CURVE

Firms under perfect competition have to adjust their respective supplies and marginal costs of production to the prevalent price in the market in such a manner that they make neither any abnormal profits nor suffer any losses. What happens to the supply curve of industry in such a situation? The answer to this question may be attempted first from the point of view of short period and then from the point of view of the long period. How can the long period supply curve in the competitive industry be derived?

The supply of the industry is merely the sum total of the supplies at a given price of all the firms which constitute the industry. We have of find out the quantities being supplied by each firm at a given price. Suppose q_1, q_2, q_3......... are being supplied by firms 1,2,3........ at price P. Then the total of q_1,

q_2, q_3.........will be the quantity supplied by the industry at price P. Likewise, we can sum up the quantities supplied at other prices. In deriving a long period supply curve of an industry, we consider only that part of the firm's supply in the short period which can be meaningfully related to the long period. Whatever may be the nature of the marginal cost price relationship in a short period, in the long period it has to be such that not only is the firm compensated for its variable cost, the price should leave sufficient margin to cover the firm's fixed cost also.

From the point of view of a long period, the supply and the marginal cost which are meaningful for the firm and, therefore, also for the industry are the supply and marginal cost at the break-even point E. By adding together such supplies of various firms, we can get at the given marginal cost and an aggregate of which will be a point on the long period supply curve of the industry. Similarly, by taking the break-even points for the other short periods, we can get other aggregate supplies being shown by points on the industry's supply curve. Thus each point on the supply curve of industry is an aggregate of the supplies of firms at the break-even points.

How will the supply curve of the industry look like when supplies corresponding to the break-even points of the individual firms or the equilibrium points of the various firms are sought to be reflected in the supply curve of the industry? This depends on how as a result of the changing number of firms in the long period, marginal cost of production behaves. If the firms in the long period are operating under constant returns to scale and therefore marginal costs are constant, the supply curve of the Industry will tend to be horizontal. If, however, under pressure of rising demand for factors, factor prices rise and therefore marginal cost of production of firms also goes up. Then from thereon, supply curve of industry will begin to rise showing that since marginal costs are higher, prices will increase with a greater supply. It could also be that because of certain reasons marginal cost declines and, therefore, the industry is able to supply more of its output at lower prices. The supply curve of an industry under this situation would be sloping downwards from left to right.

Normally there are two possibilities: (i) availability of various factors of production at increasing factor prices or (ii) the possibility of internal economies arising from entrepreneurial or organisational efficiency. If the first possibility occurs which is most likely, expansion of industry cannot take place except at rising marginal cost of production. This is because with higher factor prices in the wake of expansion, the cost of producing the extra unit of the commodity will rise. If that happens, the rise in the number of firms will lead to higher price. The other possibility of increasing returns in the long period could occur if there were internal economies due to better organisational abilities etc.

This last possibility has been a matter of controversy. It has been argued if any firm would be in such an advantageous position that by pushing forward

its production, it can lower its marginal cost. Then with the price being given, it will go on expanding its output and profits at the cost of other firms. In fact, the situation may arise in which just a few firms enjoying the internal economies would remain in the market and the rest would be driven out. This means that increased returns are incompatible with perfect competition since in perfect competition the number of firms has to be very large by definition.

External economies resulting from some special common facility provided by the industry itself can also reduce marginal cost of production of the various firms in the industry. In industry, for instance the setting up of Training Institute in turn improves the skill and efficiency of the workers enables rise of productivity and reduces marginal cost all round. However, such reduction in marginal cost due to external economies is not a very likely possibility unless there external economies can be internalized by a firm.

13.7 AN INDUSTRY'S EQUILIBRIUM UNDER PERFECT COMPETITION-LONG PERIOD

The demand curve of an industry will be the aggregate of the demand curves of all the firms comprising the industry. This demand curve will be falling to the right indicating that price in an industry remains variable, and further that a lower price will go with a larger quantity demanded and a higher price with a lower quantity demanded.

By combining the demand and supply curves, we get to know the equilibrium of the industry in the long period. If the supply curve is rising, we get the equilibrium of an industry as shown in Figure 13.15.

If the supply curve shifts to the right suggesting more supplies at a given price, the equilibrium price will be lower. If the supply curve shifts to the left, it will be higher. Similarly, if the demand curve shifts to the right implying a greater demand at the same price, the equilibrium price will rise provided supply curve remains unchanged. If the demand curve moves to the left indicating less demand at the same price, equilibrium price will fall. Increase in supplies in the long period could be because of improvement in techniques of production-say, using electric power in place of animal power. In India, he useshigh yielding varieties of seed which brought about green revolution also increased food supplies in the country.

Similarly, in the long period, tastes of people for a given commodity may improve or even go down. If the liking for the commodity improves or if the buyers' income goes
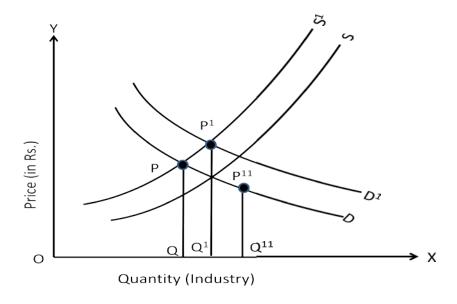
Figure 13.15 : Equilibrium of the Industry in the Long Period

up even if their taste remains the same (since with a higher income they may decide to buy more of the commodity at the same price), the demand curve will shift to the right.

In case the long run supply curve of industry is horizontal or falling to the right, the equilibrium price will be determined as shown in Figures 13.16(i) and 13.16 (ii) respectively.
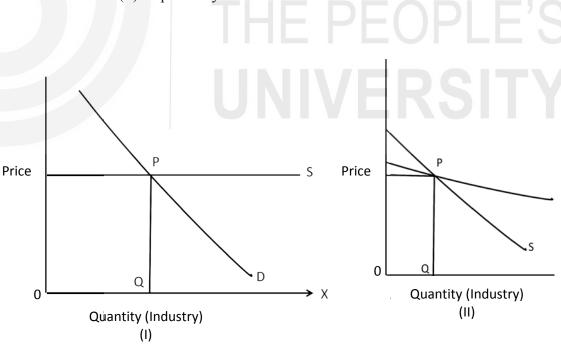
Fig. 13.16(i): Equilibrium of the Industry the long Period under Increasing Returns

Fig. 13.16(ii): Equilibrium of the in Industry in the Long Period under constant Returns

It is the case of a falling supply curve resulting from internal and external economies which is least likely under conditions of perfect competition

Check Your Progress B

1) What do you mean by supply of an industry?

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2) What is the difference between short period and long period equilibrium of an industry under Perfect Competition?

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3) State whether the following statements are **True** or **False:**

i) In the case of the industry, it is the marginal firm whose behaviour will determine the position of the equilibrium in the short period.

ii) If the firms in the long period are operating under constant returns to scale, the supply curve of the industry will tend to be horizontal.

iii) In the long run if the demand curve shifts to the right, the equilibrium price will fall, the supply curve remaining unchanged.

iv) If the liking for the commodity improves or if the buyer's income goes up even if their taste remains the same, the demand curve will shift to the right.

v) In the short period, the point of intersection of the firms will show losses, abnormal profits or normal profits.

4) Choose the most appropriate answer among the given.

i) Marginal cost equals average cost when average cost is

a) highest

b) lowest

c) zero

d) negative

ii) Equilibrium under perfect competition requires that

a) Marginal revenue is higher than marginal cost

b) Marginal revenue is lower than marginal cost

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c) Marginal revenue is equal to marginal cost

d) Marginal revenue is higher than average revenue.

iii) Shut-down point is the one at which

a) Price is equal to average cost

b) Price is equal to total cost

c) Price is equal to variable cost at its minimum point

d) Price is equal to marginal cost at its minimum point

iv) Long period average cost curve of a firm is

a) sum of short period average cost curves

b) sum of short period marginal cost curves

c) envelope of short period average cost curves

d) None of these.

v) Long period marginal cost curve of an industry would fall because of

a) difficult availability of factors of production

b) Fixity in the supply of factors of production

c) External and internal economies

d) Competition amongst firms comprising the industry.

13.8 LET US SUM UP

A perfectly competitive market has firms each of which feels helpless to influence and change the price of the commodity. Equilibrium of a firm in such a condition requires that a competitive firm adjusts its output appropriately to the given price. This adjustment will naturally depend upon supply of and demand for the commodity. Since the demand curve is horizontal, the supply curve of the firm has to so behave that it intersects or touches the horizontal demand curve somewhere. Where will the point of intersection or tangency be? The answer will depend on whether we are discussing a firm's short or long period equilibrium. If it is short period equilibrium, the point of intersection or tangency could either show losses, abnormal profits, or normal profits. If it is the long period, the point of equilibrium should show only normal profits and would occur in a situation in which average revenue, marginal revenue, average cost, marginal cost are all equal to one another.

In equilibrium of an industry under perfect competition, the short period equilibrium is best analyzed in terms of the behaviour of the marginal firm with the number of firms fixed. The long period equilibrium is analyzed with the help of an industry's **demand curve** (derived by summing up demand curves of individual firms) and **supply curve** of an industry (derived by summing up the marginal cost curves of individual firms). When the marginal cost curves are summed up, an industry's supply curve can be a horizontal straight line or a curve sloping upwards depending upon the case of availability of factors of production in the long period. The supply curve of

an industry could also be falling to the right because of increasing returns occasioned by external and internal economies. But this is not a very likely possibility.

13.9 KEY WORDS

Break-even Point: The point at which price is equal to minimum average cost.

Diminishing Returns: It indicates that the additional output of a unit of the variable factor is less than that of the previous units.

Fixed Cost: A firm's expenditure on production which will have to be incurred no matter even if the production is zero. ·

Increasing Returns: It indicates that the additional output of a unit of the variable factor is more than that of the previous units.

Marginal Firm: The firm which is additional to the number of existing firms in an industry.

Shut-down Point: The point at which price is equal to minimum variable cost.

Variable Cost: Costs that vary with the level of production; These costs are also known as direct costs or prime costs, and are the only costs that rational decision maker consider.

13.10 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress A

3   i) True   ii) True   iii) True   iv) False   v) True

Check Your Progress B

3   i) True   ii) True   iii) False   iv) True   v) True

4   i) b   ii) c   iii) c   iv) c v) d

13.11 TERMINAL QUESTIONS

1) Why should equilibrium between marginal cost and marginal revenue be a necessary condition for equilibrium of a firm?

2) At the minimum point of the average cost curve, the marginal and average costs should be equal. Why?

3) Show how short period equilibrium of a firm under perfect competition would be determined.

4) Explain an industry's short period equilibrium in conditions of perfect competition.

5) Why is it unlikely that long period supply curve of a competitive industry is downward sloping?

Note: These questions and exercises will help you to understand the unit better. Try to write answers for them. But do not send your answers to the University. These are for your practice only.

UNIT 14   MONOPOLY

Structure

14.0   OBJECTIVES

After studying this unit, you should be able to:

- distinguish between perfect competition and monopoly

- describe short period equilibrium and long period equilibrium

- explain price discrimination under monopoly.

- appreciate the measures that government can take to regulate monopoly.

14.1   INTRODUCTION

In Unit 13, you have learnt why a perfectly competitive market is important for a free market economy. It really enables production of commodities at lowest possible average cost in the long period and at prices which are equal to marginal cost of production. There is no waste of resources since production remains at the optimum level.

When we have monopoly, all these advantages disappear. Production is generally below optimum and the price is higher than marginal cost of production. The monopolist controls such a substantial portion of the market that he can dictate the price to his customers. Of course, he cannot go beyond the limits of the demand curve nor can he charge so high a price that the buyers are compelled to look for substitutes or his own high profits begin to attract new rivals in the market. Within such limits, he can, however, so fix his price that his surplus over average cost of production is maximum.

In this unit, you will learn the concept of monopoly, equilibrium of monopoly in short and long period and price discrimination. You will also learn monopoly and economic efficiency in comparison with perfect competition and the ways through which the government regulates monopoly.

14.2 CONCEPT OF MONOPOLY

While discussing market structures in Unit 12, we had referred to monopoly as a market situation with one seller only. However, such a pure or absolute monopoly is as rare a phenomenon as pure or perfect competition. It is possible that a particular seller commands an overwhelmingly large proportion of the market. But it is very unlikely that he has command over the whole market. Such a likelihood exists more in economies where the ownership of means of production is entirely in the hands of the state and where the Government is itself a monopolist. This does not happen in mixed economy of the type we have in India. However, where natural monopolies are concerned such as

> **FOR MORE CLARITY!**
> The word monopoly has been derived from the combination of two words i.e., 'Mono' and 'Poly'. Mono refers to a single and poly to control.In this way, monopoly refers to a market situation in which there is only one seller of a commodity.

suppliers of drinking water or of electricity or particular means of communication and transport or of health, the element of monopoly can be overwhelming.

The usual monopolies are those which do not have just a single seller but in which one of the sellers has a large measure of control or command of the market and, therefore, over the price at which he likes to sell his output. This has to be contrasted with perfect competition in which a seller has no choice in respect of the price at which he desires to sell his commodity.

We have referred to such a case as being one of normal imperfect competition earlier. However, we should be clear that we are not referring to absolute or pure monopoly but only to situation of a disproportionately large seller.

The Case for and Against Monopoly

When the classical economists had suggested that the economy working according to the principle of the free market was the best, they had clearly implied that there would be keen competition amongst the suppliers of goods in the market. Their idea was that once in their search for maximising their gain, the sellers began to produce more and more of output, the situation will serve the interests of the society best. Growing production of goods and services will encourage division of labour, large-scale production, lower marginal and average costs, lower prices and more wealth.

In fact, classical economists believed that things would necessarily work out in this manner, increasing the economic welfare of both the individual and the society, provided the market was not interfered with. Here you may ask a question how and why the mere fact of some individual producers and sellers making some personal gain or profit will bring about this transformation. The

answer lies in the fact that when other people find that profits are being made in the production and sale of a particular commodity, they feel attracted by the prospect of making such profit themselves. In fact, as long as profits are made by the existing producers in the market, new producers joining the market is a natural tendency. In consequence, the number of producers will go on becoming larger and the competition amongst them keener with time. You can see the advantage to the society by such a competition as each producer will now try to outsell the other and in the process minimise his cost of production. The gain to the society would be more division of labour, larger scale of production, larger output, lower cost and lower prices. This is the reason why economists have regarded perfect competition as an ideal market situation.

The more we move away from the competitive market to the monopoly one, the gains listed above become more unlikely. On the other hand, when fear of competition does not exist, or has been reduced, it will lead to monopolistic market. It is likely that the producers will not feel compulsion to go for further division of labour or raise the scale of production or minimise the cost or to lower their prices. Thus, the gains attributed to a free market economy begin to disappear once we move from a competitive market to a monopolistic one.

Economists sometimes suggest that the monopolist is an unusual creature and may not be guided solely by profit motive. He may be given to a desire to expand his output and his scale of production even if there are no compulsions. You may also note that a higher profit may yield high income while a larger scale of production provides a larger command over wealth including capital and other assets. Thus, if a person is interested in commanding a larger amount of economic resources, he may raise the scale of his output by looking at this total revenue rather than on the rate of return on his investment.

You may now ask the question; Can any producer maximise his total revenue without keeping in mind his cost of production? In fact, a monopolist tries to maximise his 'net monopoly revenue' but not really the total revenue. In this effort, he does try to handle his cost with care. (You will study in detail about this later in this Unit.) One of the ways in which the monopolist handles his cost is through innovation and technological change.

What is technological change?

It is common knowledge that the different techniques of production are not equally efficient. For example, in cooking, the cost of fuel wood is different from the cost of kerosene. Likewise, soft coke has one efficiency, gas another, electricity yet another and so on. A rational cook uses the technique which helps in reducing his cost. Similarly, in all other productive activities, different techniques have different efficiencies and costs of production attached to them. Any rational producer, including the monopolist will choose his technique with such a consideration in mind.

A monopolist to so change his technique of production that he is able to control his cost not mainly because of the fears that his competitors might

outsell him (he has no worthwhile competitor) but because this way he can expand his scale of production and enjoy considerable prestige and economic power in the market. The point to be noted is that while profit maximisation is a desire of the monopolist like all other types of producers, he has in addition, some other motive as well.

There can be various reasons why a producer turns a monopolist. There are, as has been pointed out, natural monopolies resulting from exploitation of some minerals located in small geographical areas-say a mineral like gold-and it may not be meaningful for a large number of producers to mine and exploit a small area. At the other end of the spectrum, there would be the supply of a service like clean drinking water for which extensive network of pipes is to be laid down. This is a job in which duplication by many producers will be extremely wasteful.

Apart from natural monopolies, there are those which result from grant of patents or other legal protections. Sometimes, the government provides exclusive rights to particular companies to trade in particular areas and this leads to emergence of monopoly. Lastly, there can be monopolies resulting from progress in technology, evolution of new techniques and methods of production or new products. It is possible that a particular firm or enterprise has evolved a method of producing a particular commodity which no one else knows about and this enables it to become a monopoly.

Whatever may be the reasons for the emergence of monopolies, their existence is a departure from the conditions which perfect competition considers ideal for society's welfare. However, there is one advantage which could go in the favour of a monopolist. Monopolist seeking innovation and technological change is an advantage to society. It may not be easily available from perfect competition. It may be noted that innovation is an activity which involves large expenditure and, therefore, requires a risk which the monopolist may take but the perfect competitor may not. As you know in perfect competition a producer controls an insignificant proportion of the market and operates on a slender margin of profit. Beyond his normal profit, he does not earn any surplus in the long period. He may, therefore, not be able to commit large resources to innovation.

We can, therefore, say that monopoly is not an unmixed evil. And even though the monopolist has power to manipulate his price and exploit his buyers, he works for large-scale production and division of labour and technological progress. He may be able to supply the commodity at a price which is lower than the price which prevails under perfect competition. The question, however, is whether the monopolist will work in these directions. There is nothing inherent in the structure of the monopoly market which would suggest monopolist will necessarily work in these directions.

Does monopoly lead to mis-allocation of resources?

Another point that has to be kept in mind and which reflects rather unfavourably on monopoly vis-a-vis competition is that monopoly tends to distort optimum allocation of resources. In perfect competition, as you know, price is equal to marginal cost of production, at the point of optimum

production. In such situations, the producer is unable to make any gains at the cost of his buyers. Not merelythat since all producers will be doing the same, there will be no tendency for resources to flow from one producer to another and conditions of optimum production all around will obtain. However, in monopoly, prices never equal marginal cost. It is always higher. In monopoly also marginal revenue and marginal cost have to be equal for a profit maximising equilibrium. However, since average revenue (that is, price) will necessarily be higher than marginal revenue, price will automatically be higher than marginal cost. The resources are best allocated only when price is equal to marginal cost and not when price is more than marginal cost. Hence, allocation of resources in monopoly would be less than optimum. So we can say that monopoly leads to allocation of resources.

As monopoly leads to mis-allocation of resources, governments have to evolve measures of economic policy which are anti-monopoly. They may, as in India, impose restrictions on the total investment which the monopolist can make. They may also regulate the price or control his attempt to influence the market through exaggerated or misleading advertisements. After all, when the monopolist charges higher price than the marginal cost of production, he earns surplus, which in conditions of competition would have really gone to the buyers. Therefore, by compelling the monopolist to keep his price in check the government reduces his surplus to benefit the society at large. Of course, because of government's interference, he may desist from research and innovation and thereby produce a higher cost situation. He may also not expand his production further and cause an adverse impact on employment and income generation.

14.3 EQUILIBRIUM IN A MONOPOLY MARKET

We have discussed the concept of monopoly. Now let us study how the monopolist's equilibrium is determined.

As the monopolist is in a position to influence the market; he becomes a price-maker, and not a price-taker. He is not helpless to accept the price that is ruling in the market. He can, depending on the power or influence that he has, change the price. There is another important characteristic of monopoly. A monopolist does not have to fear and, therefore, bother about the price of other commodities in the market because theoretically there would be no substitute for his commodity. In fact, it is because of this reason, he enjoys the power to influence the price. When we say that the monopolist can determine his own price, it does not mean that he can determine whatever output he wants and charge whatever price he likes. That obviously is impossible. If the monopolist chooses to fix his price, he will have to keep output flexible and decide upon only that output which can be sold at that price. On the other hand, if he chooses to fix his output, he cannot decide his price to sell that output. Thus, in spite of the fact that the monopolist is a powerful producer, he cannot produce as much as he wants and also charge whatever price he likes. He can either decide his output and let the price be determined by the requirements of equilibrium or decide the price and let his output be adjusted accordingly.

But where exactly should the equilibrium price be determined? As in case of Perfect competition, here also, the time element in respect of which equilibrium has to be determined will be an important factor. In case, we are determining equilibrium price for a short period, there will be one type of consideration while in case of a long period, there will be another type. Let us first consider the short period.

14.3.1 Short Period

First of all, a general statement about the situation in respect of the supply curve of a monopolist may be made. In monopoly, the marginal cost curve will not be the supply curve. We have already described the supply curve of a producer as one which indicates various amounts of the commodity that are intended to be supplied at various expected prices. We had also said that the producer will like to keep in mind his cost of production, particularly marginal cost so that (provided the price was such that he was compensated for the marginal cost corresponding to the intended supply) he would regard that supply as worthwhile. On this premise, the producer's marginal cost curve could be treated as his supply curve.

In case of a monopolist, however, price is not equal to marginal cost of production. Therefore, he will not consider himself as having been properly compensated if he expected a price which was equal to marginal cost. For this reason, his marginal cost curve cannot be taken to be his supply curve.

There is another aspect related to the matter of the supply curve in monopoly which derives from the fact that as the monopolist can influence the price of his commodity, his main interest will be in the demand curve that he encounters in the market. We have already noted that the monopolist does not have unlimited powers in respect of his price. He can charge the price subject to the limits of the demand curve which he faces, the more sloping is the demand curve which he faces, the more sharply he can vary or change his price. On the other hand, with a flatter demand curve, the variability in price will be smaller. The monopolist cannot charge a price which is outside these limits.

This suggests that elasticity of demand for the monopolist's product will be an important factor enabling him to influence the price. This does not however mean that (only when the elasticity of demand is zero or less than one) the monopolist will be able to charge a higher price. In order to be able to understand this statement look at Figure 14.1 where a demand curve has been shown.

It is clear from the above figure that as long as the monopolist's equilibrium is determined at any point above E_1 the price that he would charge would be higher but the elasticity of demand of the product will also be more than one. In fact, if we were to move down in some point below E the equilibrium price would be very low and also the elasticity of demand will be much less than unity. Thus, it would not be correct to suggest that it is only when the demand is inelastic that the monopolist is able to charge a higher price.
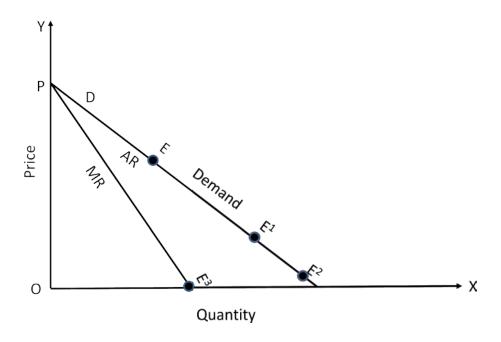
Figure 14.1 : Monopolist's Equilibrium and Elasticity of Demand

Look at Figure 14.1 where at point E_2, marginal revenue will be negative and equilibrium will not be possible. In fact, even at point E_3 where the marginal revenue is zero, equilibrium will not be possible because it would imply that the marginal cost of the monopolist is zero (equilibrium necessarily means equality between marginal revenue and marginal cost) which is a ridiculous situation.

We will thus see that the monopolistic equilibrium leading to the charging of a higher price is best determined when the elasticity of demand for the product is either equal to or greater than one but not so low as to be zero or near zero.

Having seen the importance of the demand curve and the elasticity of demand for the product, we may now refer to the kind of considerations that characterise the determination of monopoly price in the short period. The monopolist would not accept a price which does not cover his average variable cost of production. In case the price is less than average variable cost, his total revenue will be less than his total variable cost. In such a situation, he will prefer not to produce the commodity.

This, of course, is possible when his price is equal to average variable cost and he, therefore, continues to produce the commodity. The prices can be either equal to or lower than or higher than his average cost (average of both the fixed and variable costs). If the price is equal to average cost, total revenue is equal to total cost (both variable and fixed) and monopolist will neither be suffering a loss nor earning a surplus. On the other hand, if his price is more than average cost, his total revenue will be more than total cost and he will be making abnormal gains. The monopolist will be suffering a loss only when the price is less than average cost of production and, therefore, the total revenue is less than total cost.

The thing that has to be kept in mind is that the average and marginal cost curves that will help in determining monopolist's equilibrium price will both relate to a short period. Look at

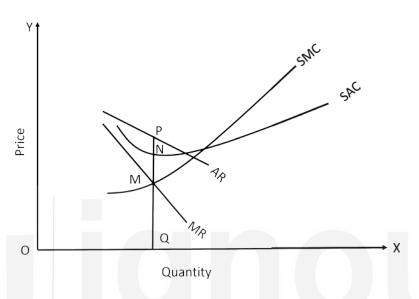Figure 14.2 where equilibrium characterised by abnormal gains has been shown.

Figure 14.2 : Short Period Equilibrium under Monopoly by Abnormal gains

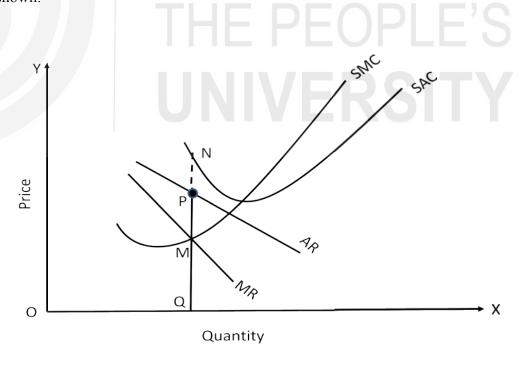Look at Figure 14.3 where equilibrium characterised by losses has been shown.

Figure 14.3 : Short Period Equilibrium under Monopoly by Losses

Look at Figure 14.4 where monopoly equilibrium characterised neither by abnormal gains nor by losses has been shown.
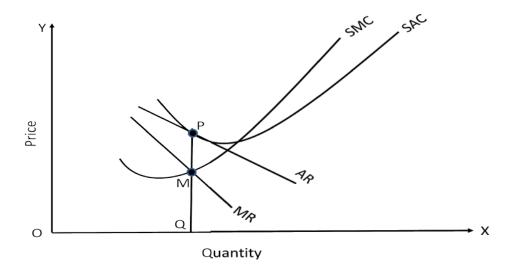
Figure 14.4 : Short Period Equilibrium under Monopoly neither by Abnormal Gains or any Losses

Remember that in all cases of equilibrium, the marginal cost curve has to cut the marginal revenue curve from below otherwise as was pointed out, in Unit 12, the equilibrium achieved will not be stable. Further, the short period equilibrium is at all one which has to remain valid only for a short period and in course of time, should change. It is because of the possibility of change (one short period gives way to another) that the monopolist in spite of all his power, will tolerate losses or a no-profit-no-loss situation.

14.3.2 Long Period

In the previous discussion, we analysed short period equilibrium of a monopolist suggesting that it could be characterised by either loss or profit or by no-profit no-loss situation. However, there is no question of a monopolist suffering losses or his being in a no-profit no-loss situation in the long period. After all, as a monopolist he has some influence on the price and he is bound to use the influence at least in the long period such that he earns a surplus over his cost of production.

How do we determine the monopoly price which reflects the real power of the monopolist? Alfred Marshall raised this question and tried to answer it in his own way. He said the equilibrium price of the monopolist in the long period will have to be one which gave him maximum net monopoly revenue. According to him, net monopoly revenue corresponding to a given output is the difference between total revenue and total cost for that output. Look at Figure 14.5 where at OQ output and PQ price the total revenue would be OQ × PQ.
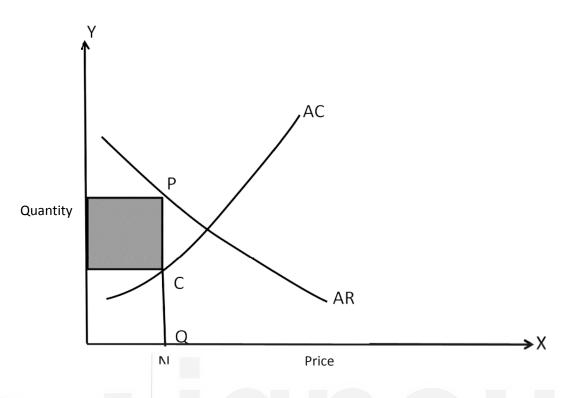
Figure 14.5 : Long Period Equilibrium under Monopoly

On the other hand, since QC is the average cost corresponding to OQ output, QC×OQ would be the total cost. We can thus say that (PQ×OQ) minus (QC×OQ) the shaded area in Figure 14.5 is the net monopoly revenue. Marshall's view was that only where this difference was maximum, the monopolist will be in equilibrium in the long period. The output corresponding to which the difference was the maximum would indicate not only what should be produced but also the price at which it would be sold in the market. Both the output and price assuring maximum net monopoly revenue will have been determined.

How is the position of maximum net monopoly revenue to be found out? Marshall had suggested that the monopolist would do that through a process of trial and error. Look at Figure 14.6 in which a number of outputs can be considered along with their prices and average costs and the difference between total revenues and total costs thus sound out.
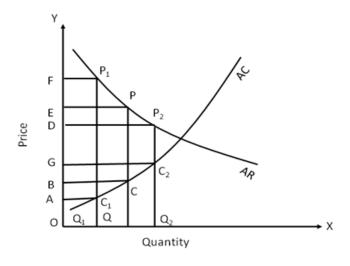
Figure 14.6 : Long Period Equilibrium Under Monopoly with various Output

The net monopoly revenues for these outputs OQ_1OQ_2 and OQ are AC_1, P_1,F, BCPE and GC_2 P_2D respectively. Since the rectangle BCPE is the largest, the. monopolist will produce OQ output and charge PQ price.

Post Marshall economists say that the long period equilibrium of the monopolist can be found through intersection of marginal revenue and marginal cost curves, which has been shown in Figure 14.7.
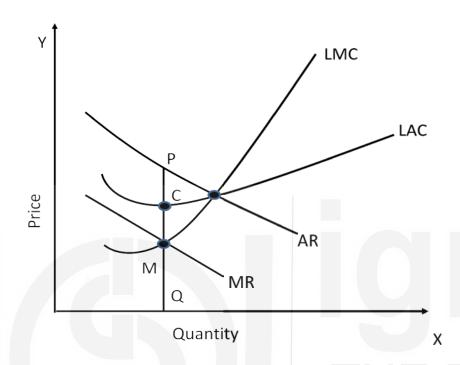
Figure 14.7 :Long Period Equilibrium Under Monopoly by Marginal Revenue and Marginal Cost Curve

It can be seen from Figure 14.7 that corresponding to the point where marginal revenue is equal to marginal cost, the monopoly output is sold at a price which is higher than the average cost of production. And so he necessarily earns a surplus. Not only that, since marginal revenue is equal to marginal cost, profit is maximum. The surplus of the monopolist is also maximum here.

In the short period at the point of intersection of the marginal revenue and marginal cost curve, the price of his commodity turns out to be higher than the average cost, he makes a profit, he may prefer to remain at the same position of equilibrium in the long period as well.

If he does that, the short period equilibrium will also become his long period equilibrium. He would not like to change because there is no compulsion to do so. Look at Figure 14.8 where long period equilibrium of a monopolist has been shown.
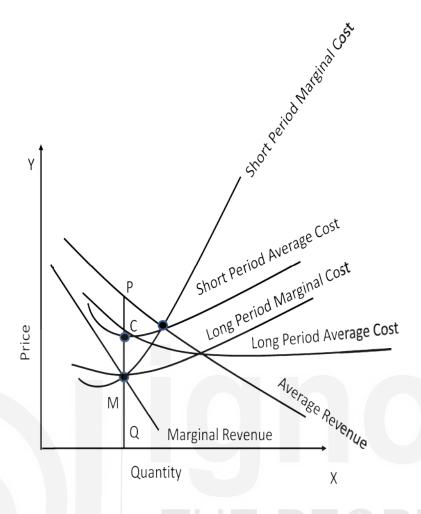
Figure 14.8 :Long Period Equilibrium Under Monopoly showing Maximum Net Monopoly Revenue

Check Your Progress A

1) What do you mean by technological change?

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2) Differentiate between Short Period and Long Period Equilibrium under monopoly.

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3) State whether the following statements are **True** or **False**.

i) Besides profit maximisation the monopolists have some other motive as well. ii) In monopoly marginal revenue and marginal cost have to be equal for a profit maximising equilibrium.

iii) Monopolists are the price-takers and not the price-makers of the market.

iv) In monopoly, the marginal cost curve is equal to the supply curve.

v) The monopolist will not accept a price which does not cover his average variable cost of production.

14.4 PRICE DISCRIMINATION UNDER MONOPOLY

Price discrimination means that for the same commodity the price charged differs from buyer to buyer as from market to market. Charging different prices from different buyers or different groups of buyers or from different markets is not uncommon. Lawyers or doctors can charge different fees from different clients. Likewise, a producer can sometimes charge a lower price in one market and higher one in another. The phenomenon of dumping in international trade is an example of price discrimination.

The two conditions which need to be satisfied if price discrimination is to be practised are: (i) The supplies of the commodity purchased at a lower price should not be resalable at a higher price, and (ii) demanders paying a higher price should not be able to transfer their demand to the market where price is lower. It is obvious that if these conditions do not obtain, price discrimination would not be possible. If buyers at a cheaper price can resell the commodity to those being made to pay a higher price, why should the latter agree to pay a high price at all? In such a situation, the seller would just not be able to enforce a differential system of prices. Likewise, if buyers facing a higher price can transfer their demand to a lower price market, the higher price market would cease to exist and only one price will rule everywhere.

While 'no resale' or 'no transfer of demand' is a necessary condition for price discrimination, they are not sufficient for inducing the practice. In order that a producer does in fact charge different prices for a given commodity, he should be assured that this way he is able to maximise his profits as well.

Of course, maximisation of profits requires equalisation of marginal cost and marginal revenue. How shall we interpret these two variables now that we have two markets instead of one? Shall we have two marginal cost curves and two marginal revenue curves? The answer is we will have one marginal cost curve and as many marginal revenue curves as there are markets in which different prices are to be charged, so that if we are considering two markets we shall have two marginal revenue curves, and so on.

Let us first understand why only one marginal cost curve would be meaningful. What needs to be appreciated is that a producer would not put up market-wise production units otherwise he will deprive himself of the advantage of economies of scale for supplying the commodity to the two

markets. He will rather produce at one place (unless there are some very special local advantages in respect of factors of production used) and then distribute his supplies market-wise. And since there will be one aggregate production for both the markets, there will be only one marginal cost curve to be considered for determining the point of maximum profit.

However, different markets are supposed to have different demand curves. In fact, it is because the demand curves in the markets being considered are not identical i.e., they are not having the same elasticity of demand at the same price, that the monopolist would be able to charge different prices in different markets. Thus, as we come to the demand side of the picture, we will have to postulate that the elasticity of demand for the commodity being supplied by the monopolist is different in different markets.

Now since the demand curves are different, the average revenue curve, being another name for the demand-price curve, will also be different in different markets. Following this, the marginal revenue curves will also be different. Since for reasons of analytical convenience, we are assuming two markets, we will have two marginal revenue curves to consider along with just one marginal cost curve. What is it that we have to do next?

Step one, is to first determine the aggregate output at which marginal cost would be equal to marginal revenue. But how do we know the marginal revenue for an aggregate output for the two markets? The answer is simple: we just add up the individual marginal revenue curves of the two markets.
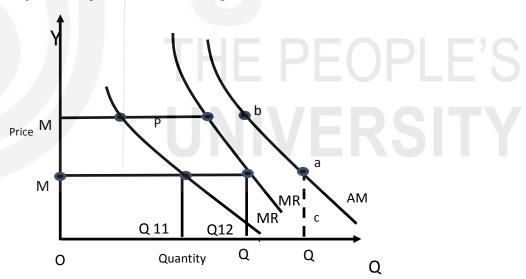
Figure 14.9 : Price Discrimination Under Monopoly

The procedure for summation is that we take the demand in market 1 corresponding to a given marginal revenue and then the demand in market 2 corresponding to the same marginal revenue, add up the two demands and show the aggregate with a point corresponding to the given marginal revenue. Look at Figure 14.9 where at OM_1 marginal revenue, the demand in market 1 is OQ_2 while at the same marginal revenue the demand in market 2 is OQ_1. We then add up OQ to OQ and get a sum like OQ_1, being the demand for an aggregate output for the two markets, corresponding to OM. In other words, $OQ_1 = OQ_{11}, +OQ_{12},$. I Let the point showing the situation be 'a'. Likewise

we can consider marginal revenue OM_2, and the aggregate output OQ2 corresponding to this marginal revenue. We then get another point 'b': and so on. By joining the points a, b,...... etc., we get the curve which shows marginal revenues at various aggregate demands of the two markets.

Step two. Where 'aggregate' marginal revenue curve intersects the marginal cost curve, the monopolist's equilibrium will show maximum profit from the two markets. We fix this point of intersection at M. Study Figure 14.10 carefully

Step three. Once the aggregate output in the two markets has been determined, we have only to work out the distribution within the limits of the demand curve pertaining to each of the two markets.

Step four From the point of intersection of the aggregate' marginal revenue curve and the marginal cost curve, we draw a horizontal straight line cutting the marginal revenue curves of market 1 and market 2 at points M_1 and M_2.

Step five At point M_1 we draw a vertical line P, S, from the demand curve of market 1. Likewise at point M_1 we draw a vertical straight line P,S, from the demand curve of market 2

OS_1, will be the output supplied by the monopolist in market 1 at price P_1, S_1, and ..:: OS_2, the output supplied in market 2 at price P_2,S_2.

It may be noted that in market 1, the marginal revenue is MS, which is the same as the marginal cost MS. By drawing a horizontal straight line from the point of intersection of 'aggregate' marginal revenue and marginal cost curve i.e., M we have assured that MS, = MS i.e., in market 1, marginal revenue is equal to marginal cost. Likewise, we can see that in market 2 also, marginal revenue $M^{11}S_2$ = MS, the marginal cost.
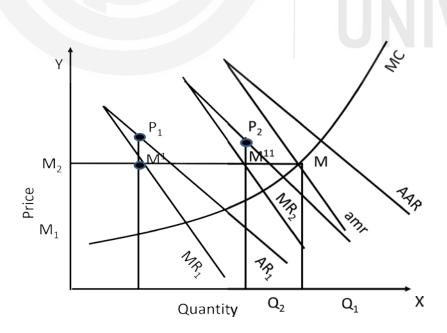
Figure 14.10 :Price Discrimination of Monopolists Showing Maximum Profit

The significant thing that is to be noted is that price P_1S_1, of market 1 is different from price P_2S_2, of market 2. That is why it is a case of price discrimination-same commodity, same producer but two different prices because the demand curves in the two markets have different elasticities.

14.5 MONOPOLY AND ECONOMIC EFFICIENCY: COMPARISON WITH PERFECT COMPETITION

We have already noted that price in monopoly is not equal to but higher than marginal cost of production. Suppose it so happens that an industry which had a large number of firms competing with one another gets monopolised. Then the same falling demand curve earlier that of the competitive industry will now be faced by the monopolist.

This demand curve becomes his price or average revenue curve and corresponding to this average revenue curve, there is a marginal revenue curve sloping downward but
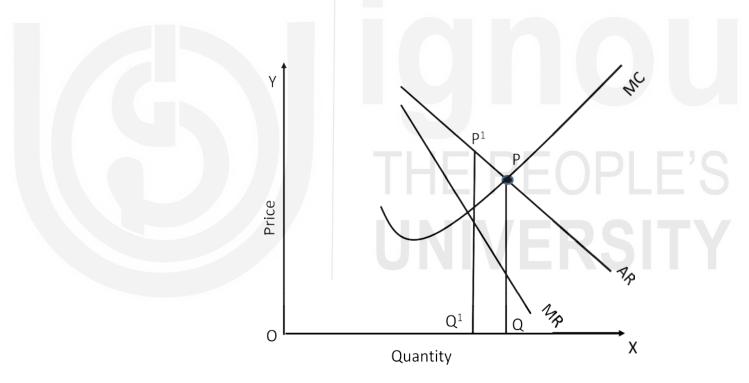
Figure 14.11 : Short Period Equilibrium of an industry

would be lying below the average revenue curve. Another point to be noted is that the marginal cost curve of the monopolist may either be the same as in the case of competitive industry or different. If it is different (and there could be valid reasons for the difference) it will have its own implications for the equilibrium of the monopolist. However, if the marginal cost is the same, the total output supplied by the monopolist would be lower than what the competitive industry would have supplied. (competitive industry's equilibrium would have taken place at point P where the price is equal to the marginal cost of production.) The monopoly price Q_1P_1 will be higher than the competitive industry's price QP.

It may, however, be repeated that the higher monopoly price and the lower monopoly output (as compared to what could happen in conditions of perfect competition) are due to the fact that the marginal cost curve of the monopolist has been assumed to be the same as that of the competitive industry.

Marginal cost, after monopoly has replaced competition can be different, for the following reasons:

1) In perfect competition, there are a number of producers each managing with a smaller output and, therefore, a smaller scale of production. In monopoly, the output supplied are large and therefore, scale of production will be very much larger.

2) Secondly, since there will be centralised organisation for production and sale now, there will be further economies in cost available to the monopolist.

3) The monopolist is given to innovation which he can afford better than the perfect competition. Because of his larger turnover from larger output, he can further reduce his cost by adopting better techniques of production.

Thus, it is not always true that monopoly would result in a higher price and a lower output.

There are other reasons also why monopoly price may not be higher than price under perfect competition.

The monopolist may be afraid that if he charged high price, the consequent surplus that he would earn may induce potential producers to try to produce if not the same, then a similar commodity. In such a situation, the monopolist's own sale and profit could be adversely affected. Therefore, the monopolist may avoid charging a higher price for his commodity. Secondly, the monopolist may have a name and prestige resulting from his command over resources which he would not like to see spoiled by the impression that would go round that he was a greedy, profit-seeking person. In order not to be known as a producer out to exploit his customers, he may keep his price low.

Thirdly, the monopolist could as well compel Government intervention to regulate his price if he showed any tendency to exploit his customers. Thus, it is as much likely that monopoly price is the same or lower than competitive price as that may be higher. For that reason, it is as much likely that the monopoly output is the same or higher than that in competition as that is lower. Even if monopoly price is lower and monopoly output higher than in perfect competition, can we say that monopoly is an efficient form of market structure? The answer is 'no' for two reasons.

Firstly, since the monopoly price is always higher than marginal cost of production, the monopolist gains at the cost of his customers. We have already seen that in conditions of perfect competition, the producer earns no

surplus at the cost of his customers because he keeps his price equal to marginal cost.

Secondly, monopoly suffers from what may be described as technical deficiency. This is due to the fact that in all conditions of imperfect competition including monopoly, equilibrium tends to take place when the average cost of production curve is falling rather than rising. In such a situation equality between marginal revenue and marginal cost (as a number of previous diagrams explaining equilibrium would show) necessarily takes place before the lowest point of the average cost curve i.e., before the optimum point. **This means that monopoly output is generally less than optimum output.** Further, this would suggest that the average cost of producing the commodity is higher than what it could be. This also shows that the resources are not being optimally exploited and to the extent that this is so, they are idle and being wasted.

14.6   REGULATION OF MONOPOLY

In view of the fact that the monopolist has a tendency to charge a price which is higher than the marginal cost, the Government may regulate monopoly price to prevent exploitation of the consumer. What happens if the Government does that? Look at Figure 14.12 where P_1, Q_1, is that price which a monopolist is charging at present and suppose further that the Government forces the monopolist such that his price is now P_2Q_2. We can easily see that not only the new price is much lower than the old one and the new output OQ_2, is higher than the old output OQ_1, but also that the new regulated price is one which is equal to the average cost of the monopolist. This implies that his total revenue is equal to the total cost of production and, therefore, he is not making any profit at the expense of the customers. This price will certainly be in the interest of the consumers but it will still not be like the one in perfect competition. In perfect competition price is equal to marginal cost of production whereas in the diagram below that is not so. In fact, even though the monopolist is not earning any abnormal profit, the price is higher than the marginal cost. It is possible for the Government to bring the price down to the level of marginal cost and fix it at the point P_3. However, in that case the monopolist will remain in a state of permanent loss because at P_3, the average cost of production is higher than the marginal cost and since the price has been made equal to marginal cost, total revenue will be less than total cost of production. Unless, a method is devised to compensate the monopolist for this loss, he may as well stop production. The only way in which Government can regulate monopoly, if it is desires that the consumers do not pay a price higher than marginal cost of production is for it to provide a subsidy to the monopolist. However, the provision of subsidy may have other problems. But when subsidies are financed through deficit financing, inflation would occur and this would inflict losses on the consumer in other ways. Provided subsidies are financed through taxes, this also would affect consumers adversely unless a neutral scheme of taxation for the purpose has been devised, which is not quite easy.
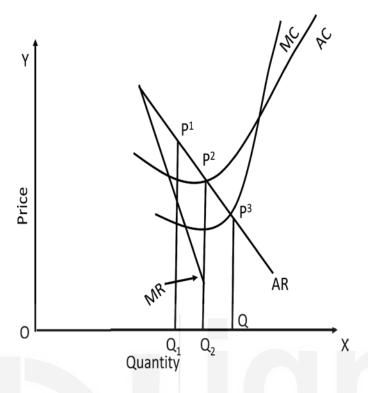
Figure 14.12 :Regulation of Monopoly

Check Your Progress B

1) What do you mean by Price Discrimination?

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2) Distinguish between monopoly and perfect competition.

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3) State whether the following statements are **True**or **False.**

   i) Maximisation of profits requires equalisation of marginal cost and marginal revenue.

   ii) Different markets are supposed to have different demand curves.

   iii) In monopoly price is lower than the marginal cost of production.

   iv) Monopoly output is generally less than optimum output.

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v) Government may regulate the monopoly price because monopolist has a tendency to charge a price which is higher than the marginal cost.

4) Choose the appropriate answer among the following alternatives.

i) The monopolist has command over

    a) whole market

    b) small market

    c) large market

    d) none

ii) Monopolist is a

    a) price taker

    b) price maker

    c) one who does not bother about the price of the market

    d) one who is very much anxious about the market price.

iii) The price under monopoly is

    a) higher than marginal cost of production

    b) lower than marginal cost of production

    c) higher than average cost of production

    d) lower than average cost of production.

iv) In the imperfect competition including monopoly equality between marginal revenue and marginal cost takes place

    a) at the optimum point.

    b) after the optimum point.

    c) before the optimum point.

    d) at any point.

14.7 LET US SUM UP

While perfect competition is the ideal, monopoly is a fact of life. In actual life, we do not have perfect knowledge, perfect mobility, etc., and, therefore, individual producers are not as helpless to influence the price of their commodity as they are when these conditions are present. Nor is the number of sellers in a market always so large that an individual seller may control just an insignificant proportion of the total market.

While the forces helping to determine equilibrium price in monopoly are the same as in perfect competition, namely, those of demand and supply, their relative roles do change in between these two markets. For example, the marginal cost curve which plays such a vital role in perfect competition, ceases to be that important. It no longer serves as a supply curve because price charged by a monopolist always tends to be higher than marginal cost.

Thus the only use of the marginal cost curve is that it helps to fix up the point of intersection between itself and the marginal revenue curve. The monopolist takingadvantage of his monopoly power likes to fix his price in a way that his net monopoly - revenue is maximum. And such a price can be only the one at which marginal revenue is equal to marginal cost. So a marginal cost curve is necessary for determining a monopolist's equilibrium but it does not truly serve as his supply curve.

Maximum net monopoly revenue, however, is something which a monopolist must earn in the long period. In the short period, he could as well suffer a loss in case at the point of equality of marginal cost with marginal revenue, the average revenue was lower, than average cost. However, in the long period the monopolist can so act on the cost and revenue curves that he is able to reach a position of maximum net monopoly.

Monopoly leads to production which is less than optimum. To that extent, therefore, it is inefficient, wasteful and harmful to the interest of the consumers and the society. That is why Governments in modern economies like to regulate the function of monopolies.

14.8   KEY WORDS

Aggregate Marginal Revenue: The marginal revenue corresponding to aggregate demands of two or more than two markets under discriminating monopoly.

Monopoly: The state of the market in which one seller has a disproportionately large measure of control or command of the market and, therefore, over the price at which he likes to sell his output.

Natural Monopoly: The situation in which it is so natural for a producer to become a monopolist. Suppliers of drinking water or electricity are examples of a natural monopoly.

Net Monopoly Revenue: The difference between total revenue accruing to a monopolist from a given output and the total cost of that output.

Price Discrimination: The kind of a monopoly situation in which the monopolist is able to charge different prices for the same commodity from different buyers in the same market or in different markets or different prices even for different units of the commodity from the same buyer.

14.9   ANSWERS TO CHECK YOUR PROGRESS

Check your Progress A

3   i) True ii) True iii) False iv) Falsev) True

Check your Progress B

3   i) True ii) True   iii) False   iv) True   v) True

4   i) c ii) b iii) a iv) c

14.10   TERMINAL QUESTIONS

1) What is monopoly? How does this concept differ from that of perfect competition?

2) Explain the case for and against monopoly.

3) What is net monopoly revenue? When is it that it is maximum?

4) Explain the determination of a monopolist's equilibrium in the long period.

5) How will be the equilibrium be determined under degree of price discrimination in monopoly

6)   Explain with a simple diagram how government can attempt to control the price charged by a monopolist.

Note: These questions and exercises will help you to understand the unit better.   Try to write answers for them. But do not send them for assessment to the university. These are for your practice only.

UNIT 15   MONOPOLISTIC COMPETITION

Structure

15.0   OBJECTIVES

After studying this unit, you should be able to:

- explain the significance of product differentiation and the role of advertisement in promoting sale in a monopolistic but competitive market

- identify the reasons on account of which the free entry of new firms into the market could become difficult

- explain how the aggregate average cost of production curve is derived and how equilibrium price and output, determined with such a cost curve would differ from that determined by average cost of production curve only.

- explain the short period equilibrium and long period equilibrium

- differentiate between monopolistic competition and perfect competition in respect of price and output in the two situations

- explain how monopolistic competition could be inefficient and wasteful.

15.1   INTRODUCTION

You have learnt that perfect competition and monopoly represents extreme situations each almost opposite to the other. It is possible that in the earlier stages of industrialisation, we had situations which were similar to, if not the same as, perfect competition. The number of sellers producing an identical good was large but there was no attempt to innovate and have product

differentiation. Subsequent industrialisation created conditions for the setting up of 'big business' and 'large houses' - something similar to monopoly. It also motivates smaller producers to outsell their rivals by trying to supply differentiated products in the market. Now the situation of a large group of producers seeking to produce not identical but slightly different commodities to outbid their rivals could not be described as perfect competition. Nor of course, it be described as monopoly because of the very large number of sellers involved. It was, therefore, described as monopolistic competition. On account of the largeness of number, it remained a case of competition all right but because each producer would try to appear to be the sole producer of a differentiated product, it was something of a monopoly too. Hence the name 'monopolistic competition'. In this unit, you will learn the emergence of non-competitive markets and barriers to entry in monopolistic competition and the short period and long period equilibrium under monopolistic competition.

15.2 EMERGENCE OF NON-COMPETITIVE MARKETS

It has already been mentioned above that in actual life we tend to have imperfect rather than perfect market. In unit 12, while discussing the structure of markets, we mentioned that depending on the number of sellers, the homogeneity of the product, the elasticity of demand for the commodity and some other factors, markets will differ from one another. In monopolistic competition, the number of sellers is large and each seller commands only a small proportion of the total output. This is in - contrast to oligopoly where each seller controls a significant portion of the market demand, the seller in monopolistic competition can influence the price of his commodity. This is what distinguishes him from a seller in perfect competition. How does it happen that even while controlling a small part of the total market, the seller would be able to influence the price of the commodity.The answer lies in the fact that the seller can indulge in product differentiation. This does not happen in perfect competition because by definition, that is a state of the market where the product supplied by any and every seller is the same.

What happens when a producer is able to supply some product which is a little different from the one which the others are supplying? The fact that his product is different from that of the rest, he can charge a different price according to the quality of his product. This gives him the capacity to influence the price.

However, even while being a little different from that of the others, his product is not such that other products of the market cannot at all be substituted for it. Thus, if he tries to raise his price too much, he may lose his customers who will then switch over to the substitutes. Thus the extent to which the producer under monopolistic competition can influence the price for his product is rather limited. But in so far as the power to influence the price is concerned, the competition but one sloping downwards to the right.

The two important features of monopolistic competition are as follow.

i) **Product differentiation to develop brand loyalty:** One is that through various means particularly product differentiation, a monopolist competitor is all the time trying to develop brand loyalty amongst his buyers. Whenever he puts across a new quality of the product in the market, he hopes to carry his buyers on to the new product. He also does so with a measure of control over the price which he charges from his old as well as new buyers. This, in other words, means that a new product enables him to have a new demand or average revenue curve. Now, if it is remembered that a new product being qualitatively different from the old one it will also involve change in the average cost curve. We can say that monopolistic competition, a shift in the average cost curve, brings along with it a shift in the average revenue curve as well. This points to a kind of interdependence between average cost and average revenue curve which is a peculiar feature of monopolistic competition. This has, however, not to be confused with interdependence amongst sellers (which is, we shall see later a characteristic of oligopoly).

ii) **Non-Price competition:** The second feature of this market is that since the number of sellers is very large and each seller can influence the price of the commodity to some extent, sellers make tremendous efforts to attract buyers towards their products. In this effort, they engage in non-price competition. It can be easily seen that price competition always carries with it the risk of retaliation. Therefore, as far as possible the monopolist competitor tries to engage in various forms of non-price competition,

One such form is known as advertising. This advertising can broadly be of three types: 1) informative, 2) persuasive, 3) exaggerated, false and misleading.

Informative advertising aims at providing the market the details about the usefulness, effectiveness and long-run cheapness of the product in clear and honest terms. Such an advertising can only be welcomed because it adds to the knowledge of the buyers. and sellers and to that extent enables building up a healthy market situation.

The persuasive type of advertising is aimed at diverting the buyers with such information as may even by playing upon their weaknesses. Toothpaste advertisements often use dentists to recommend the products to the potential comsumers.
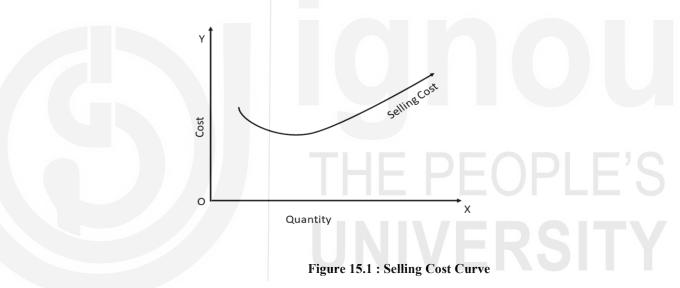
The third type of advertising is that in which qualities or characteristics which are not to be found in the product are advertised in order to misguide the buyers. Such business propaganda violates ethical norms and cannot, therefore, be looked at with favour. In India, the Monopolies and Restrictive Trade Practices Commission (MRTPC) is empowered to take action against monopolists who engage in unfair trade practices.

The communists have often questioned the propriety of wasting so much money on advertisements. It is interesting that in certain countries the expenditure on advertising tends to be as high as that on research and

innovation. This is not very desirable because whereas expenditure on research builds up innovation and technical change and raises productivity, advertising confers no corresponding benefit.

The expenditure on advertising is regarded as a selling cost of the commodity, i.e., we talk of two costs of a commodity instead of one. One is production cost and the other selling cost. Production cost comprises the cost incurred on the various inputs which go into the output of a commodity-plant, equipment, raw materials, labour etc. Selling cost, on the other hand, is the expenditure incurred on making a product acceptable to the buyers. The expenditure on advertisement can easily be seen as a major item in the selling cost of the product.

The shape of the cost of production curve which has been discussed in the previous units should be familiar. How will the selling cost curve be drawn? In this connection it has been suggested that the average selling cost curve will also be like the average cost of production curve. It will first fall with the rising output and then rise.

Figure 15.1 : Selling Cost Curve

That is to say it will also be like the familiar U-shaped average cost curve. The reason for such behaviour of the selling cost curve is almost the same as in the case of average cost of production curve. In the beginning, advertising expenses incurred will induce more than proportionate increase in the sale of the commodity but later they will induce a less than proportionate increase. Suppose the selling cost goes up by 5%, then in the earlier stage the sales could go up by 10%, or more than 5%, so that the selling cost per unit of output will go down. However, this happens upto a point. But when beyond that point selling cost is raised by 5%, sales might increase by 2% or 3% or at any rate by less than 5%. Obviously the selling cost per unit of output will fall with rising output unto a point but beyond that point it will rise and so the selling cost curve will also be a U-shaped curve like the production cost curve. This has been shown in figure 15.1.

Look at Figure 15.2 where the aggregate average cost curve in which selling cost is includedvis-a-vis the production cost curve has been shown.

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At OQ output, CQ is the aggregate average cost in which selling cost is included but CQ is the production cost. Therefore,CC[1] is the selling cost. Thus the distance between the two curves is a measure of the selling cost being incurred by the producer
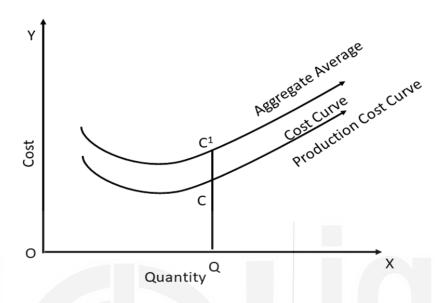
Figure 15.2 : Aggregate Average Cost Curve and Production Cost Curve

One reason why conditions of monopolistic competition emerge is rather simple. It is that the factors which make for the existence of the perfectly competitive market are often not to be found in real life. These factors are perfect knowledge, perfect detachment between buyers and sellers and perfect mobility. We may also add yet another factor which is talked about, namely, irrationality of the buyers even though imperfect detachment may include this factor. It is not uncommon for some buyers to equate quality with a higher price. Once the seller has become aware of this weakness of his buyers, he may charge a higher price even though he does not control any significant part of the market.

15.3 BARRIER TO ENTRY AND MONOPOLISTICSTRUCTURE

One of the effective ways of assuring that the producer will not have everything his own way and the benefits of production will be passed on to the consumer also is to assure that there are no barriers to the entry of new producers into the market. For instance, if there is on the part of any producer, the tendency to charge a price higher than average cost of production and thereby earn abnormal profit. In such situation, the fear that other producers might be attracted by higher profit and start producing the same commodity can be a powerful deterrent against the tendency. However, the entry of other producers is not as easy as may be supposed. When the classical economists had suggested that the free market system was the best for a society, they had assumed that markets would be completely free in

respect of entry or exit of firms involved in the process of production. That is how the notion of perfect competition was developed and that is why a perfectly competitive market structure came to be regarded with favour. Somehow the history of the market in free market economies does not indicate that perfect competition has become stronger with time. On the other hand, what we see is a wide variety of imperfect competition. You have already learnt about monopoly and now let us discuss monopolistic competition. Both of these are market structures which differ from perfect competition and in both producers are able to create conditions which benefit them more than the society. However, barriers to entry are a feature of monopoly rather than that of monopolistic competition.

There are various reasons behind barriers to free entry of firms in a market as discussed below:

1) **Control over supply of raw materials:** The producer who has already established himself may be having crucial control over the supply of raw materials required in the production of the commodity. In such a situation, intending firms may decide to keep out because they may have difficulty obtaining raw materials from the already established firms. This naturally leads to a kind of indirect barrier to the entry of new firms in the market.

2) **Limited supply:** The extremely limited supply of the raw material and in case some firms are already using it (say, gold or any such mineral) for their production, newer firms could not be easily accommodated because the raw material is very limited in supply.

3) **Absolute cost advantages:** The absolute cost advantage which the existing firms will have in comparison with the intending ones. This is because the momentum of early start has built up their scale of production large enough to give them the advantage of economies of scale. The firms intending to enter the market will have to first manage a large amount of resources so that they also can make the minimum investment. This is comparable to that of the already established firm. It is not every firm which can pick up courage to plunge into the market with such a large amount of investment.

4) **Large expenditure on advertising & product differentiation:** The established firm may be spending lot of money on advertisement, product differentiation etc. Larger is such expenditure, the more it is likely to discourage free entry of firms into the market.

5) **Rivals antagonised approach:** Rivals may use thefts, bribery and canvassing of workers of other establishments to the extent that the quality of the product of a rival is spoiled and its sale in the market is damaged.

6) **Government's interference:** The Government may have already granted legal rights by way of patents and other provisions to an existing firm with the result that it has a monopoly over the processes of production of the concerned commodity. Naturally this will prevent the other firms from producing the same commodity.

7) **Natural monopoly:** There may be a case of natural monopoly. As is well-known, such monopolies, say water supply or power generation, are spatially so extensive. This involves so much expenditure that it may be wasteful for many producers to try to duplicate the infrastructure involved in the production and supply of these goods to the people.

8) **Moderate price policy:** Sometimes barriers to entry can be the consequence of the already established firms deliberately pursuing a moderate price policy.

9) **Secretive firms:** Sometimes the existing firms are so secretive about their operations that the intending firms do not get any idea of the former's costs, sale and profits at all. Such secrecy acts as a barrier to the entry of intending producers.

It will thus be seen that there can be many factors acting as barriers to the entry of firms in a market. As long as we do not have a method for removing these barriers, the competitive market structure cannot become a reality. On the other hand, lack of fear from potential producers and their competition emboldens existing firms to exploit the market in a manner that the balance advantage is tilted against the society.

It may, however, be once again pointed out that in the market structure which we call monopolistic competition, there is, by hypothesis, no barrier to the entry of firms into the market. Even so the monopolistic competition, as we will see later, does not confer the same benefits on the society which perfect competition does.

Check Your Progress A

1) Distinguish between monopolistic competition and monopoly.

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2) What do you mean by non-price competition?

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3) State whether the following statements are **True** or **False**

   i) In actual life we have a perfect rather than imperfect market.

   ii) In monopolistic competition the number sellers are large and each seller commands large proportion of the total output.

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iii) According to classical economists, the free market system was the best for a society.

iv) Government interference poses a barrier to free entry of the firms in the market.

v) Selling cost curve first fall with the rising output then rise.

15.4 ÉQUILIBRIUM IN A MONOPOLISTIC COMPETITION

Individual firm's equilibrium under Monopolistic Competition

The demand curve for the product of an individual firm is downward sloping. Since, the various firms under monopolistic competition produce products which are close substitutes of each other, the position and elasticity of the demand curve for the product of any of them depend upon the availability of the competing substitutes and their prices. Since, close substitutes for its product are available in the market; the demand curve for the product of an individual firm working under conditions of monopolistic competition is fairly elastic. Thus, although a firm under monopolistic competition has a monopolistic control over its variety of the product but its control is tempered by the fact that there are close substitutes available in the market and that if it sets too high a price for its product, many of its customers will shift to the rival products.
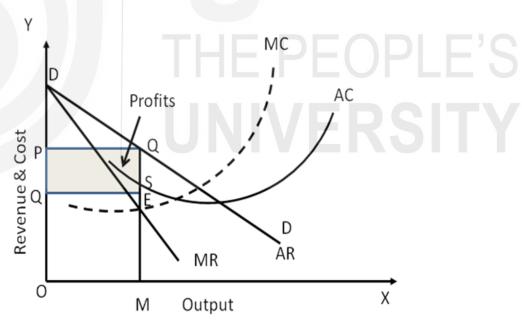
Figure 15.3 : Individual Firm's equilibrium under monopolistic competition (with profits)

The individual equilibrium under monopolistic competition is graphically shown in figure 15.3

DD is the demand curve for the product of an individual firm, the nature and prices of all substitutes being given. This demand curve DD is also the average revenue (AR) curve of the firm. AC represents the average cost curve of the firm, while MC is the marginal cost curve corresponding to it. It may

be recalled that average cost curve first falls due to internal economies and then rises due to internal diseconomies.

Given these demand and cost conditions a firm will fix its price and output at the level which gives its maximum total profits. Theory of value under monopolistic competition is also based upon the profit maximisation principle, as is the theory of value under perfect competition. Thus, a firm in order to maximise profits will equate marginal cost with marginal revenue. In figure 15.3, the firm will fix its level of output at OM, for at OM output marginal cost is equal to marginal revenue. The demand curve DD facing the firm in question indicates that output OM can be sold at price MQ=OP.Therefore, the determined price will evidently be MQ or OP. In this equilibrium position, by fixing its price at OP and output at OM, the firm is making economic profits equal to the area RSQP which is maximum. It may be recalled that profits RSQP are in excess of normal profits which represents the minimum profits necessary to secure the entrepreneur's services are included in average cost curve AC.

Thus, the area RSQP indicates the amount of supernormal or economic profits made by the firm.
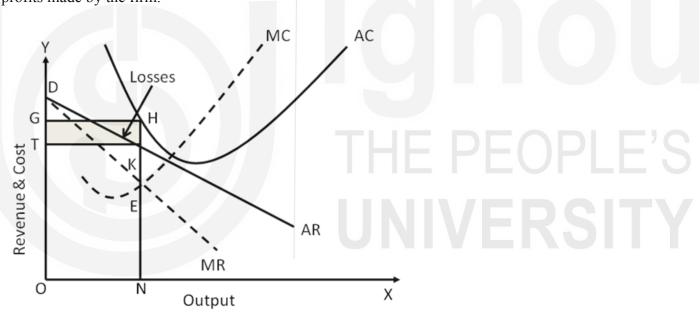
Figure 15.4: Individual Firm's equilibrium under monopolistic competition (with losses)

In the short run, the firm, in equilibrium, may make economic profits, as shown in above figure, but it may make losses too if the demand conditions for its product are not so favourable relative to cost conditions. Figure 15.4 depicts the case of a firm whose demand or average revenue curve AR for the product lies below the average cost curve throughout indicting thereby that no output of the product can be produced at positive profits. However, the firm is in equilibrium at output ON and setting price NK or OT by fixing price at OT and output at ON, it is rendering the losses to the minimum. In such an unfavourable situation there is no alternative for the firm except to make the best of the bad bargain.

We thus see that a firm in equilibrium under monopolistic competition, as under pure or perfect competition, may be making supernormal profits or losses depending upon the position of the demand curve relative to the position of the average cost curve. Further, a firm may be making only normal profits even in the short run if the demand curve happens to be tangent to the average cost curve.

15.5   FULL-COST PRICING

You have seen in the discussion of long period equilibrium that whatever the monopolistic competitor's surpluses in the short period, ultimately they are going to be wiped out. This happens because there being no barrier to the entry of new firms in the market, surpluses attract more firms. At the same time, when total output rises, his demand-price curve shifts downwards until price has become equal to average cost of production.

Thinking that surpluses are going to disappear, supplier decides right from the start to fix his price just equal to average cost of production. This is also known as the method of full-cost pricing. Look at Figure 15.5 where the

> **FOR MORE CLARITY!**
> Full cost pricing is a practice where the price of a product is calculated by a firm on the basis of its direct costs per unit of output plus a markup to cover overhead costs and profits.

supplier straightway fixes his price at P_1 the point of intersection of his average revenue and average cost curves. He produces OQ output rather than first fix the price at P_1, for a short period and makes surpluses. After that it allows other firms to be attracted into the market and to cause a lowering of his average revenue curve to point P_2 where-surpluses disappear, as they should, in the long period. The advantage in the full-cost pricing method is obvious. The producer ends up with a larger output than is possible under the other method of equating marginal cost to marginal revenue. The long period output in figure 15.5 is OQ_2, if perceived in terms of the marginal cost, marginal revenue equality but it is OQ when decided in terms of full-cost pricing.

The full-cost pricing principle is also known as the principle of mark-up pricing. It may not be quite feasible to act upon the marginal cost-marginal revenue equality principle, howsoever, theoretically impressive it may otherwise look to a producer. Finding out marginal revenue and marginal cost in actual market conditions and trying to equate they may be too trying and tedious business for him. He would rather prefer to make some tentative estimate of his average cost and mark-up the estimate by whatever is in his judgement the proper amount necessary to assure him
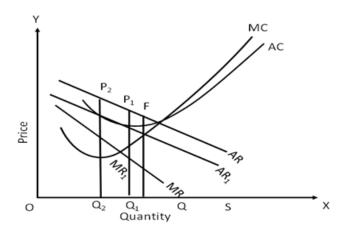
Figure 15.5: Full Cost Pricing

of the requisite compensation for his investment. It is this marked-up amount
which would be the price he would prefer to charge. That is why the principle
is also described as one of mark-up pricing.

15.6 DOES MONOPOLISTIC EQUILIBRIUM CAUSE RESOURCE WASTE?

Let us compare equilibrium under monopolistic competition with that under
perfect competition.
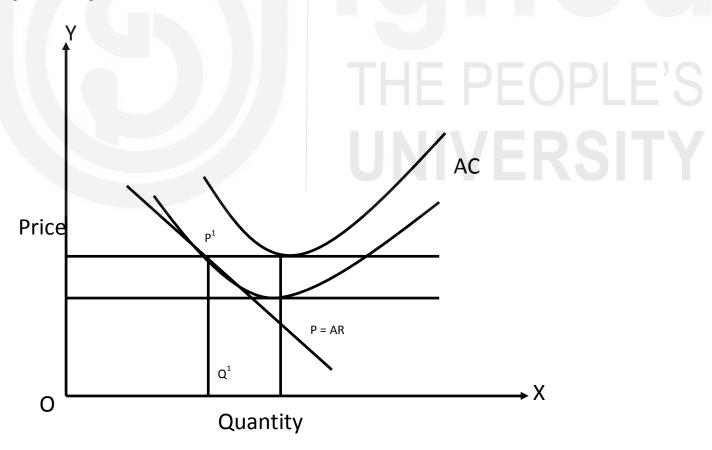
**Figure 15.6 :Equilibrium Under Monopolistic Competition showing comparative
Efficiency**

Look at Figure 15.6 where P^1Q^1 is the price and OQ^1 is the output at
equilibrium under monopolistic competition. Assume the same price was to

rule and we were in a perfect competitive situation. Then the average cost curve will have to shift such that its minimum point touches (long period equilibrium under perfect competition always occurs at the point of tangency of the horizontal price line and the average cost curve) the price line indicating the price P^1Q^1. If the average cost curve is not to change, then perfect competition equilibrium will require a new price, the line indicating at point P tangency to the given average cost curve AC.

Thus in order to make the two market structures comparable, we either take the price to be the same in the two markets and allow appropriate change in the average cost curve or we take the same average cost curve and allow for change in price. If we change average cost curve, we have the interesting result that under perfect competition, producers put in a higher average cost for selling the commodity at the same price. However, since there is nothing to suggest that inputs in perfect competition should be inferior or costlier, we can infer that a higher average cost implies that when there is perfect competition, there is a better quality of the commodity available at the same price.

On the other hand, if the average cost curve is not changed and only the price is, the perfect competition equilibrium will give us a larger output OQ and a lower price PQ. Under monopolistic equilibrium, we may note, the output is OQ^1 which is lower and price P^1Q^1 which is higher.

This rather simple comparison shows that in monopolistic competition buyers have either to pay a higher price or accept a lower quality of the product than under perfect competition. Thus compared to perfect competition, monopolistic competition is said to be less efficient.

The suggestion and the resulting controversy regarding waste which is implicit in monopolistic competition is due to following reasons:

i)   When a large number of producers begin individually to produce and supply a product which is to be different from that of the rest. At the same time, when each producer's share of the market is insignificant, he cannot make full use of the economies of large-scale production. In other words, his average cost will tend to higher and the buyers to that extent will be adversely affected.

ii) The selling costs or expenses on advertisements which are more often persuasive or misleading rather than informative. Buyers are made to bear the burden of these advertisements both directly in the shape of higher prices and also through advertisements created loyalty to particular brands of the product. Such loyalty comes in the way of the emergence of truly competitive conditions in the market.

iii) The equilibrium picture of the monopolist competitor in which he maximises his profit at an output which is necessarily lower than optimum.

Chamberlin, who built up the idea of monopolistic competition, feels that while considering wastefulness of such a market structure, we should not lose sight of the variety of production which it makes possible. Consumer

satisfaction should not be taken to be based on price only; it should also be based on the fact that he has a larger choice in respect of the commodity he buys. In perfect competition all produce nearly the same quality of the commodity, in monopolistic competitions they produce different qualities and this is also an advantage which should be taken into account.

So far as selling or advertisement costs are concerned, while they may be wasteful, they could sometimes shift the aggregate average cost curve of a producer. This shift may go to such an extent that the point of equilibrium involves no idling and no waste of the inputs involved in production.
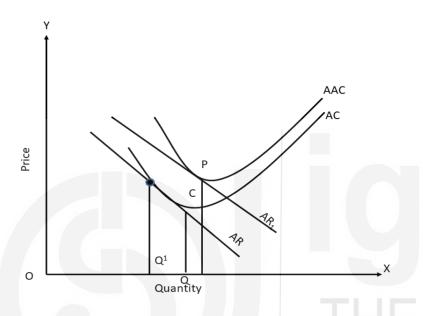
Figure 15.7 :Equilibrium Under Monopolistic Competition Showing the output in comparison with optimum output

Study Figure 15.7 carefully. After the selling costs are added to production costs, the aggregate average cost curve AAC has a point of tangency with the AR_1, curve at point P where the equilibrium output is OQ On the other hand, the lowest average cost of production CQ^1 and the optimum output is OQ^1. It can be seen that equilibrium output OQ is higher than the optimum Output OQ^1.

Thus it may not always be that there is excess capacity and waste of resources. The selling cost may so shift the aggregate average cost curve that at equilibrium, the output is more, and not less than capacity output.

There is another situation leading to the same conclusion. And that is the one which was analysed earlier in connection with the full-cost pricing principle. You have seen that provided the monopolistic competitor and his eyes on a long rather than a short run adjustment, he could so fix up his equilibrium that his price was equal to average cost of production. You have also learnt that it is only in the short period that he can earn a surplus over his average cost. In the long period because of absence of barrier to entry of new firms, this surplus will disappear and he will have to produce at a price which becomes equal to his average cost and leaves him with no surplus at all.

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Now if a producer under monopolistic competition practices full-cost pricing, his output could be larger than the optimum output. Of course, in full-cost pricing, there would be no room for maximising surplus as happens when there is equality between marginal cost and marginal revenue. At least in the short run, the scope for making abnormal profits exists. If there are producers who are interested in making such profits, then in their case equilibrium will take place at a point which comes earlier than that of optimum production. In their case, then idling and waste of resources would be unavoidable.

One aspect of inefficient production under monopolistic competition about which there is no controversy comes from the fact that here too, as under monopoly, price is not equal to marginal cost of production. We have referred to this issue in the discussion of monopoly, pointing out how and when price is not equal to marginal cost, a sub-optimal allocation of resources results. So in the sense that price charged by a monopolistic competitor is never equal to marginal cost but actually above it, allocate efficiency of this type of the market is always less than optimum.

Check Your Progress B

1) What do you mean by full-cost pricing?

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2) Define resource waste.

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3) State whether the following statements are **True** or **False.**

   i)   In monopolistic competition demand curve slopes downwards.

   ii) In monopolistic competition average cost and average revenue curves are to some extent interdependent.

   iii) Monopolistic competitor produce different qualities of product.

   iv) In monopolistic competition buyers have either to pay a higher price or accept a lower quality of the product than under perfect competition.

   v)   In the short period, the monopolistic competitor cannot earn a surplus over his average cost.

4) Choose the correct answer for the following questions.

   i) In monopolistic competition the number of sellers is

      a) few

      b) five

      c) two

      d) large

   ii) The demand curve in monopolistic competition is

      a) horizontal

      b) vertical

      c) sloping upwards to the right

      d) sloping downwards to the right

   iii) Equilibrium price in monopolistic competition is

      a) equal to total cost of production

      b) average cost of production

      c) marginal cost of production

      d) none of these

   iv) Selling cost curve tends to be

      a) horizontal

      b) always rising

      c) always falling

      d) U-shaped

   v) Output in monopolistic competition is in equilibrium when

      a) marginal revenue is higher than price

      b) marginal revenue is equal to price

      c) marginal cost is higher than average cost

15.7 LET US SUM UP

Monopolistic competition signifies a market situation in which while the number of sellers is so large that each seller has only an insignificant part of the total market to cater to. The seller is not as helpless to influence the price of the commodity as in perfect competition.

Consequently, the demand curve facing him is not a horizontal straight line. Such a demand curve, we have seen in unit 13, means that the seller can sell his output at the ruling price but he cannot influence or change the price. In monopolistic competition this is not so. However, since the price can be changed to howsoever a limited extent that might be, the demand curve facing a monopolistic competitor will be like that of an imperfect competitor (i.e., sloping downward to the right). Naturally, therefore, the marginal

revenue for various levels of output will also be drawn in a similar manner. Further, the marginal revenue will be lower than average revenue.

With marginal and average cost curves being U-shaped, the intersection of the marginal revenue and marginal cost curves which would determine equilibrium could take place as in monopoly or imperfect competition but with one important difference. In monopolistic competition, because the number of sellers is very large and there is no barrier to entry of new firms, a seller cannot earn surplus over his average cost of production. The entry of new firm in attraction of earning similar surplus and the acute competition with the large number of existing firms will compel lowering of this surplus. This can go to such an extent that in the long period it completely disappears and price is just equal to average cost of production.

Thus in monopolistic competition marginal revenue has to be equal to marginal cost but average revenue has also to be equal to average cost of production ultimately. With a sloping demand curve, this can happen when that demand curve is tangential to the average cost curve just above the point of intersection of the marginal revenue and marginal cost curves. As it turns out to be, at such an equilibrium position, output will be lower than optimum while average cost will be higher than minimum. Thus in monopolistic competition, price should tend to be higher and output lower than what it could be in conditions of perfect competition. Further, because the output stops short of the optimum level, there is idle capacity and wastage of valuable resources in the former.

15.8 KEY WORDS

Full-cost pricing: When a seller fixes his price such that it is equal to his average cost of production, and he does not bother to equalise his marginal cost with marginal revenue and earns no abnormal profit.

Monopolistic competition: The state of the market in which a seller can influence the price of the commodity in spite of the fact that the number of sellers is very large and each seller controls only an insignificant portion of market supply.

Optimum output: The output which corresponds to the bottom point of the U-shaped average cost of production curve.

Product differentiation: When a seller tries to supply a different quality of the same commodity.

Production cost: The expenditure incurred on producing a commodity.

Selling cost: The expenditure incurred on the promotion of sale of a commodity.

15.9 ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

3   i) False ii) False iii) True iv) True v) True

Check your progress B

3   i) True ii) True iii) True iv) True v) False

4   i) d ii) d iii) b iv) d v) d

15.10 TERMINAL QUESTIONS

1)   Explain fully the concept of monopolistic competition.

2)   What are the reasons behind the difficulties which come in the way of free entry of firms into a market?

3)   Distinguish between production and selling cost. Show how the aggregate average cost curve of a monopolist competitor should be drawn?

4)   How is the long period equilibrium under conditions of monopolistic competition determined?

5)   What is full-cost pricing principle? Does it lead to a higher than optimum production?

Note: These questions will help you to understand the unit better. Try to write answers for them. But do not send your answers to the University. These are for your practice only.

UNIT 16　OLIGOPOLY

Structure

16.0　OBJECTIVES

After studying this unit, you should be able to:

- define oligopoly and enlist its characteristics;

- distinguish between monopolistic firm and an oligopolistic firm;

- explain the effects of interdependence on the equilibrium price and output under

- oligopoly;

- describe why oligopolists try to collude amongst themselves rather than compete;

- explain the implications of collusion.

16.1　INTRODUCTION

In units 14 and 15, you have learnt that in the absence of perfect competition, we get imperfect competition which could take either the form of monopoly or monopolistic competition. But these two categories of market do not exhaust all the situations under imperfect competition. Even when the number of sellers is more than one, though not large, there can be some features of the imperfection in the market which will remain to be understood and analysed. Where the number of sellers is large, capacity for product differentiation may give each seller a little power to influence the price of his commodity. This does not happen in perfect competition where the seller has no such power at all because there is no scope for product differentiation: On the other hand, under monopoly, the seller yields unquestioned power to

influence the price. In between the number of sellers may be so small that each of them commands a substantial share of the market. They can of course influence the price but are not free enough to do so for fear that other sellers might neutralise it. This creates a situation which is different from both monopoly and monopolistic competition. This situation is called oligopoly.

In this unit, you will learn the meaning and characteristics of oligopoly, and price and output equilibrium in an oligopolistic industry. You will also learn concentration and collusion under oligopoly and pricing without formal collusion. An economic evaluation of oligopoly will also be discussed.

16.2 CHARACTERISTICS AND KINDS OF OLIGOPOLY

The market structures are often identified by the number of sellers that happen to operate in them. If the number is large, we have a perfectly competitive market structure. If it is small, we may have monopoly and oligopoly. In oligopoly, the number of sellers is more than one but less than eight.

In oligopoly, a firm can influence price, output, quality, sale etc. while in monopoly one firm alone can do it without bothering about the reaction of other firms in the market.

In oligopoly then

a) each of the few sellers should command a substantial portion of the market.

b) each is, therefore, a serious rival to the other and there is a tendency towardsfierce competition.

c) no seller can fix his price, output, quality, production and advertisement cost, without trying to assess what the others are likely to do.

There can be various kinds of oligopolies. Oligopolies can be classified into perfect oligopoly and imperfect oligopoly. A perfect oligopoly is that in which the producers do not indulge in product differentiation.

This renders competition even more tricky in the sense that there can be endless price war.

> **FOR MORE CLARITY!**
> An oligopoly is an industry which is dominated by a few firms. In this market, there are a few firms which sell homogeneous or differentiated products. Also, as there are few sellers in the market, every seller influences the behaviour of the other firms and other firms influence it. Oligopoly is either perfect or imperfect/differentiated. In India, some examples of an oligopolistic market are automobiles, cement, steel, aluminium, etc.

The price charged can settle anywhere between the maximum which is much above the average cost of production and the minimum which is equal to average cost. It can be seen why this should be the state of affair in a perfect

oligopoly. After all, one advantage of product differentiation is that the seller, even if he is charging a slightly higher price than the rest can hope to retain the same part of the market because his product is to some extent different. In fact, through advertisements he may even succeed in creating the impression that his product is superior. However, where product differentiation is absent, this limited scope also does not exist. In perfect oligopoly, there is hardly any need for advertisement and for incurring selling costs. All that remains is price competition and that too of the fiercest possible kind. In such circumstances, if any producer raises his price he can almost be sure of the reaction and one really does not know where this war of action and reaction will take him. Thus starting with an initial price which may be well above cost of production perfect oligopoly may, because of price-war, end up with a price which is just equal to average cost of production. In conditions of perfect oligopoly equilibrium becomes even more difficult and the market remains in the grip of an uncertainty which may be greater than in the other types of oligopoly.

Unlike perfect oligopoly, imperfect oligopoly implies product differentiation. It can be seen that such a market will have some kind of non-price competition as well. There will be attempts to advertise product differences and to that extent dependence on only price competition will be reduced. Now to the extent that imperfect oligopoly admits non-price competition also, the price-war will produce uncertainty but possible not of the type which prevails under perfect oligopoly. Therefore, in imperfect oligopoly, the range within which price will move above the level of average cost can be smaller than that in perfect oligopoly. However, the limitation of range does not make price any more determinate under imperfect oligopoly than in the perfect one.

Thus, uncertainty and the consequent indeterminateness in equilibrium are unavoidable in oligopolistic market. For this reason, oligopolists agree to interesting organisational arrangements in order to survive. One such arrangement is known as a Cartel; another Merger; and another is a Ring.

Cartel is an arrangement whereby different oligopolistic firms join together not only to fix the price they would charge but also the share of the market each would be entitled to. It can be seen that in this arrangement they aim at some kind of joint profit maximisation. It may be noted that, however much a Cartel may desire to restrict the entry of other firms into the market, it does not have legal means of doing so. The OPEC (Organisation of Petroleum Exporting Countries) is a Cartel which seeks to fix the price of oil and also the sharing of the world oil market between the member countries. However, while agreeing on price and market sharing may be easy, policing the agreement can be difficult. This happens so because there is an inherent tendency on the part of producers to try to outwit other producers in ways which involve infringement of the common arrangement. The main thing in a Cartel which distinguishes it from a Merger is that the oligopolists retain individual control of their production unit. This does not happen in case of merger where the control of individual units also vests in a central organisation.

There is also an organisational arrangement known as Ring in which producers at the same stage of development try to combine with a view to charging a higher price.

The main purpose of all these different organisational arrangements is to assure that there is no price-war and that entry in the market is barred as far as possible. In fact, even in some of the principles of price determination in oligopoly, barring of entry is particularly kept in view. For instance, there is a limit-pricing principle which suggests that oligopolists try to charge such a price as is neither so high that excessive surplus may be earned, nor so low that there is very little surplus. Therefore, price charged is sought to be limited. The purpose behind the limit is to prevent intending producers from being attracted by excessively high profits.

The oligopolist has to guard against two kinds of fears. One is fierce rivalry which may lead to disastrous price as well as non-price competition and the other is possibility of entry of new firms into the market. Therefore, he tries to so fix his price that both these dangers can be avoided. What needs to be noted is that with such a price fixation there can be no uniquely determined price which could be appropriately called an equilibrium price. This means that while we have a number of tentative explanations of what an oligopolist would or should be wanting, we do not have any satisfactory theoretical explanation of the price at which he can be said to be in equilibrium.

16.3 MONOPOLISTIC AND OLIGOPOLISTIC FIRMS

An oligopolist cannot construct his demand curve as easily as a monopolist can. He may have great difficulty in arriving at his average and marginal cost curves because of the difficulty involved in finally deciding the quality of his product.

Look at Figure 16.1 where dd and cc curves are demand and marginal cost curves respectively of a seller when he has not to bother about the reaction of the other sellers in respect of his price or output. But if possible price or product reactions are considered, the shapes and positions of the demand and cost curves would not be the same. They will change to dd^1 and cc^1 respectively on the assumption of one type of price and product reactions. With more of such reactions, the two curves would change still further and soon, almost endlessly.
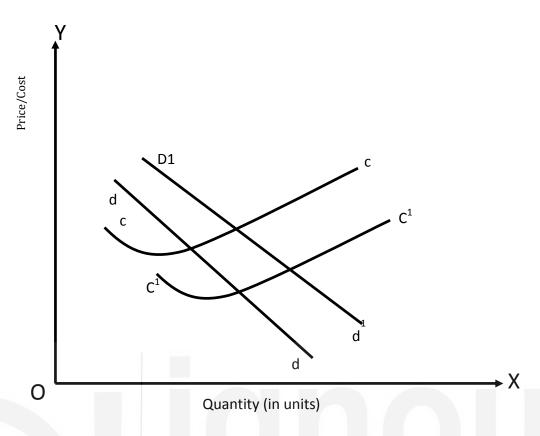
Figure 16.1 :Demand and Marginal Cost Curves of a Seller

The demand curve in oligopoly cannot be firmly drawn and therefore, the behaviour of marginal revenue curve also remains unpredictable. With such a state of affairs, arriving at equilibrium with the help of marginal revenue and marginal cost curves becomes very difficult.

It is suggested that because of this difficulty and because of the oligopolist not being in a position to know when exactly his profit is maximised, he sometimes likes to aim not at maximum but stable and secure profits.

The over-riding characteristic of oligopoly is inability of a seller to take independent decisions in respect of any of the factors like the price he charges, the quality of the product that he puts on sale, his cost of production, his advertisementor selling cost and his general market strategy. In so far as the fewness or smallness of number is one of the characteristics of oligopoly, it will be worth emphasising. But by itself fewness cannot give that idea of interdependence which makes oligopoly the serious challenge which it is to theory of value. It is, therefore, not surprising that we cannot claim to have a satisfactory answer to the problem of determination of equilibrium price and output in oligopoly.

16.4 PRICE AND OUTPUT EQUILIBRIUM IN AN OLIGOPOLISTIC INDUSTRY

We have already noted that interdependence is a fundamental characteristic of oligopoly. By the same token, it is independence which characterises a monopoly because a monopolist can take all his decisions without bothering

about what the rest of the market would do. This makes price determination under monopoly easier than under oligopoly.

Interdependence arises from the necessity, first, to assess the actual reaction of a rival to a seller's decision to charge a particular price or supply a certain output or a certain quality of the commodity etc. After that they guess what the rival would think of doing further in case the original seller made adjustments in the light of the first actual reaction. Consequently, interdependence comes to mean guessing about a whole lot of actual and assumed reactions and interactions leading to great uncertainty. This is not merely in respect of the determination of equilibrium but also about the operation of the entire business of the oligopolistic market.

If output is a function of all the possible prices others also can charge, the analysis becomes so involved and difficult that unless we make definite assumptions about the number of sellers involved, their possible prices, the quality of their output etc. we just cannot proceed with the analysis. What is worse is that an oligopolist will not only have to guess his rival's prices, output, quality etc., but also how these might change in case the oligopolist changed his own policies in response to these guesses. Such a change in the oligopolist's policies may necessitate fresh assessment of the reaction of rivals. In case this is to be done in respect of existing rivals, it is bad enough but in case this is to be done in respect of unknown rivals who might jump into the market if their entry cannot be barred, it is worse.

Various attempts at analysing equilibrium price and output under oligopoly have been made from time to time. Those which do not admit of a simple, elementary treatment are being left out of discussion here; others will of course be taken up. However, one important point regarding a complex situation may be noted. They have proceeded on highly restrictive assumptions. For example, often the assumption has been of two producers. We call a two-seller oligopoly by a special name **duopoly.** It can be seen why duopoly is less difficult to handle. With a larger number of sellers, the reaction-intersection possibilities multiply and along with that the uncertainties surrounding determination of equilibrium also arises. Sometimes the analysis would assume complete barrier to entry into an oligopolistic industry. This is also done for convenience. Other assumptions relate to rivals' reaction in respect of price and output. Analysis of duopoly has often tended to suppose that the other rival producer would keep his output or price unchanged even though the first one is free to change it. Even more highly restrictive assumptions, we cannot claim to have found a satisfactory answer to the problem of equilibrium price and output in an oligopolistic market.

Check Your Progress À

1) List the three characteristics of Oligopoly.

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2) Distinguish between monopolistic and oligopolistic firms.

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3) Differentiate between Cartel and Merger.

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4) State whether the following statements are **True** or **False.**

    i)   In an oligopolistic market a seller has no control over price.

    ii) Oligopoly producers indulge in product differentiation.

    iii) An oligopolist's equilibrium price and output tends to be indeterminate.

    iv) Ring is an organisational arrangement where producers at the same stage of development combine with a view to charge higher prices.

    v)   In oligopoly the behaviour of marginal revenue curve remains unpredictable.

16.5 OLIGOPOLY-CONCENTRATION AND COLLUSION

When oligopolists collude, they attempt to maximise their profit jointly rather than individually. An individual's attempt at profit maximisation get bogged down into uncertainty and may threaten the very survival of an oligopolist. Therefore, oligopolists often either through some kind of a formal agreement or through an informal understanding manage to have common arrangements in respect of price, quality differential, sales promotion, market sharing, prevention of entry of other firms etc., so that all of them can survive. It is the very opposite of competition in which one tries to go ahead irrespective of whether anyone else remains or is eliminated from the market. With collusion, power over the market gets concentrated as if in one hand.

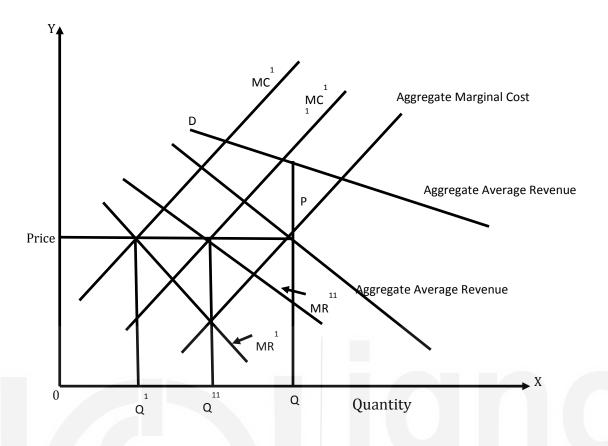Look at Figure 16.2 where joint profit maximisation has been shown.

Figure 16.2 : Equilibrium of Oligopolists in a Situation of Collusion

Suppose for convenience, we assume only two oligopolistic firms in the market. Let the marginal revenue curve of firm 1 be MR^1 while that of firm 2, MR^{11}. The first thing which we may do is to have a combined marginal revenue curve for both the firms. The way to work out such a combined curve is the same as used in the case of discriminating monopoly. For a given marginal revenue, we find out the demands for output of firms 1 and 2. We then add up the two demands and corresponding to the marginal revenue given, we find the points. Likewise, for other marginal revenues.

By joining these points, we get a new curve labelled aggregate marginal revenue which shows various levels of aggregate demand for the output of both the firms corresponding to various levels of marginal revenue. Like the aggregate' marginal revenue, we can find the aggregate marginal cost curve also. This 'aggregate' marginal cost curve shows various levels of aggregate output of the two firms and the various marginal costs which correspond to them. It can be seen that the point of intersection of the 'aggregate' marginal revenue and the marginal cost curves at point P will give us the total output which the two oligopolistic firms will agree to supply to the market. Having got the output, we find out the price, which should be charged, from the aggregate' average revenue curve or the demand curve (DD) which also will be a sum of the individual demand curves of the two oligopolists. Thus both the price and the total output which maximise joint profit will have been determined.

The interesting features of such a solution to the problem of price determination under oligopoly may be noted. First while the firms will distribute their output in the manner indicated in the Figure 16.2 where it has been shown that firm I will supply OQ^1 output while firm 2 will supply OQ^{11} output but they will charge the same price i.e., QP. This will be so because the firms have already agreed not to engage in a price war. Such a war could be ruinous to their interest. So output may differ but the price will be the same.

The outputs of the different firms will have to be such that their individual marginal costs are the same and are equal to their respective marginal revenues. It is only when these conditions are fulfilled that the equilibrium indicated in Figure 16.2 will be valid.

This solution looks very similar to the one relating to discriminating monopoly discussed in unit 15. But there is a basic difference which arises from the fact that whereas in discriminating monopoly, there are separate markets, each having a demand curve with elasticity different from the other, this is not true to oligopoly.

Such a solution to the problem of price determination is similar to what would happen if there was monopoly. Actually the two separate firms are separate only in name; in actual fact they are like different plants of a single producer. At least this is what they look like when we consider the procedure used for determining the price and for sharing of the output in between them.

16.6 OLIGOPOLISTIC PRICING WITHOUT FORMAL COLLUSION

It may be remembered, however, that collusive oligopoly can be informal also in the sense that the firms do not commit themselves to any particular agreement. They have a tacit understanding amongst themselves about the quality differences in the product to be sold, the price differences and output sharing and that they try to adhere to the understanding only broadly but not in detail. Sometimes such an informal collusion works better than the formal one. Even so, it remains a collusion and to that extent there is no competition and the benefits which could accrue to the consumer from competition are denied to them.

Suppose that the various firms continuing in an oligopolistic market do not aim at collusion at all, how will they fix their price in that case? In such a case again they would not compete but just accept an arrangement whereby the price to be charged is set by some particular firm in the market. Operationally what this means is that one particular firm is accepted as the leader and it is allowed the privilege to determine the price which others should also charge. This is what is described as the **price leadership solution.** It can be seen that in such a solution there is no particular agreement to share the market. Only the price is fixed and the destructive price-war is avoided.

Indirectly, however, the leader-firm naturally has the upper hand both in respect of the profitability of the price settled and also in respect of the share

of the market. In fact, the leader-firm may already happen to be the controller of a substantially larger part of the total market than the other firms are. This means that the price leadership solution is unlikely to be one with which the other oligopolist firms would be happy.

The case that we have just considered is one of leadership by a firm which is dominant in the sense that it has a larger share of the market, it produces on a larger scale and, therefore, controls a larger portion of the market. That, however, does not mean that there is only one kind of price leadership which is possible, namely that by the dominant firm. It is suggested that sometimes smaller firms can also be price-leaders and here, two kinds of smaller firms can be thought of.
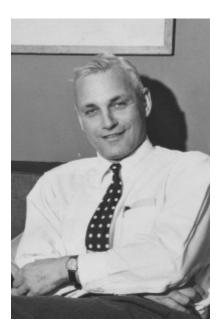
One is that a small firm which inspite of its controlling only a small part of the market manages to keep its cost of production low. The advantage of such a firm is that it can charge a lower price without being a loser. The larger firms may accept this one as the price-leader because they may already be in a tight position due to their high cost.

The second kind of price-leadership by a small firm would be that where inspite of its smallness, the firm is vigilant and alert in respect of not merely the changes which are currently taking place in the market but also knowledgeable about the changes that are likely to occur in the future. Such a firm has the capacity to serve as a barometer of the market situation so that if it is satisfied that in view of its understanding of the market, price should be raised, then other firms will follow suit by raising the price. If on the other hand, the smaller firm felt the price could be lower, other firms trusting this firm's wisdom will also lower their price.

There can be problems in case of price leadership by a smaller firm if other firms have their own interpretation of the market situation which is different from that of this particular firm. In that case, price war may become unavoidable.

Now we can take up the case which is attributed to Sweezy model, given by Paul Sweezy, namely, determination of oligopoly equilibrium on the assumption that price-war is limited only to situations of price reduction. This happens in a manner that if one oligopolist lowers his price others will also lower it just to the extent that their respective shares of the market remain what they were before price reduction.

Further, in the event of raising his price, an oligopolist will lose part of his market to his rivals because they naturally may not be interested in raising the price.The economist Sweezy had suggested that within such a limit as this, namely, that if an oligopolist raised his price, his rivals would not do that.

The economist Paul Sweezy

At the same time and that if he lowered his price, they will lower their own to same extent, the average revenue curve i.e., the demand-price curve will have a kink at some point. The significance of the kink is that at the point of the kink the price charged will be such that any price higher than that, the rival will not be interested in matching while at lower prices they would report by lowering their own price. Look at Figure 16.3 where the shape of the demand curve has been shown.

At the point of kink namely point P other rivals will not raise their price, the demand for the productof the oligopolist will go down even more than it would in the ordinary downward sloping demand curve. This is the same thing as saying that this portion of the oligopolist's demand curve will become more elastic than before. It may be noted that the demand at the point of kink does not become zero even though other oligopolists are not raising their price because of product differentiation. However, a decrease in price by the oligopolist will be matched by corresponding decrease by the other oligopolists so that demand for the product of our oligopolist does not increase. In other words, from the point of kink downwards, the oligopolist's demand curve will have lower elasticity and will be similar in shape to the demand curve under ordinary imperfect competition.
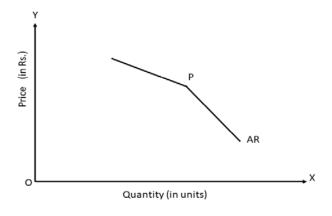
Figure 16.3 : Average Revenue of an Oligopolist

When the average revenue curve of the oligopolist is kinked, his marginal revenue curve becomes discontinuous as shown in Figure 16.4
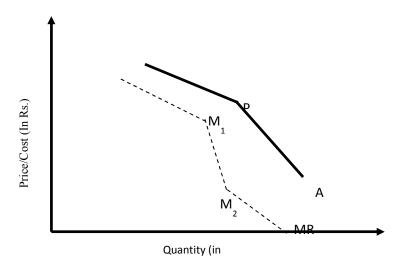
Figure 16.4 : Average and Marginal Revenue of an Oligopolist

With this special kind of average and marginal revenue curves, Sweezy seeks to determine an oligopolist's equilibrium by putting in the marginal cost curve. The equilibrium is shown in Figure 16.5.
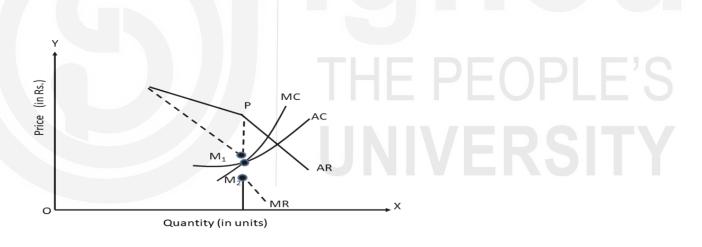
Figure 16.5 : Equilibrium of an Oligopolist

It will at once be clear from the Figure 16.5 that Quantity (in units) between the two points of discontinuity M_1 and M_2, there can be no point of intersection between marginal cost and marginal revenue. This means that in between these two points there is no determinate equilibrium.

Thus, the Sweezy solution based on a kinky demand curve is also not satisfactory because it does not impart determinateness to oligopoly equilibrium inspite of very limiting assumptions. However, one feature of the solution of oligopoly problem with the help of the kinked demand curve is encouraging and that is by referring to the kind, Sweezy explains why some type of price rigidity obtains in oligopoly. As can be seen, since by raising the price the oligopolist will not increase his own price. On the other hand, by lowering his price he would remain where he is because other oligopolists

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will also lower their price, the inclination to experiment with price change could be absent. This only means that after fixing the price once, the oligopolist will not like to change it because the change is unlikely to be beneficial either way. Thus the Sweezy analysis has one merit in any case; it helps to explain why price under oligopoly tends to be rigid.

There are economists who take the view that in actual life oligopolists like monopolist competitors, do not prefer to go by the nice ties of marginal cost and marginal revenue. They prefer to fix price in such a way that after allowing for a certain mark-up which compensates them for the profit they consider that price as reasonable which is equal to average cost of production. This is similar to what we discussed in monopolistic competition and is called the principle of full-cost or administered or mark-up pricing.

Will this principle explain why oligopoly price tends to be rigid? The answer is that it will, provided the average cost curve of the oligopolist tends to be flat at the bottom as shown in Figure 16.6
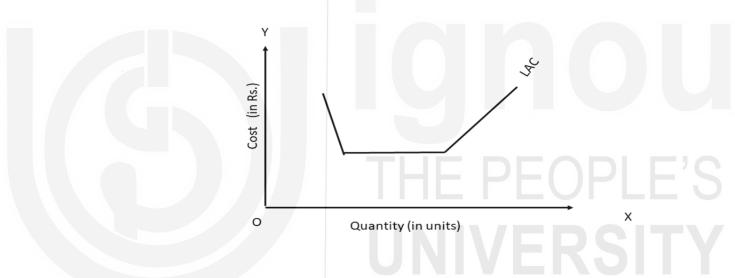
Figure 16.6 : Long Period Average Cost of a Oligopolist

Figure 16.6 where the average cost first falls and then rises, at its bottom i.e., where it is lowest, it remains the same for a considerable range of output. It isobvious that if equilibrium is determined on full-cost pricing principle, that is, price is made equal to average cost with an extra mark-up for profit. In this case, the price will tend to be sticky or rigid since the average cost itself tends to be so.

While the full-cost pricing method of determining equilibrium is simple, its assumption that an oligopolist may not be interested in bothering about maximising his profit. Therefore, about finding out precise values of marginal cost and marginal revenue is questionable. It may be recalled here that there is a basic difference between monopolistic competition and oligopoly. In oligopoly, we have already seen, existing producers try to erect barriers to the entry of new producers in the market. Obviously the purpose behind such barriers. is to try to create conditions whereby the profit of the existing firms can be maximised. Therefore, it is difficult to see why the

oligopolist will abandon attempt at deriving maximum profit through equalisation of marginal cost and marginal revenue.

The only justification for such a non-maximising behaviour could be what has already been pointed out, namely, that the attempt to maximise profit could result in a pricewar threatening the very survival of the oligopolist. But we have also seen that there could be other ways of avoiding this threat such as joint-profit maximisation etc. Thus what an oligopolist will choose for himself will depend upon the exigency of his situation. Such exigencies as consist of the fellow oligopolists' actual and assumed reactions are an integral part of the uncertainty which characterises oligopoly and which makes the determination of equilibrium so difficult and problematic.

16.7 ECONOMIC EVALUATION OF OLIGOPOLY

The failure to determine appropriate equilibrium price apart, how helpful should we regard an oligopolistic market to be from the point of view of the economic well-being of the society? Is it a market structure which should be encouraged or even tolerated?

Amongst the considerations that are to be kept in mind while answering such a question is the fact that often in their desire to ward off competition, oligopolists collude to keep the price of the product high, no matter if that leads to limited sale and production and, therefore, existence of unused capacity. Further, price is used for prevention of competition and thereby for assuring the existing firms that the price rules high and that resources locked up in the factories would remain more or less permanently underutilised. All this could obviously have been avoided, if at least the entry of new firms into the market was not barred through collusion and manipulation. It is because oligopoly is at least in this sense detrimental to social interest that Governments make anti-trust laws and interfere with the market.

Not that every such interference succeeds in improving the economic and social well-being of the people. Consider, for instance, the case of the Government imposing a lumpsum tax on the oligopolist to reduce his surplus. While this will transfer some resources from the oligopolist to the Government, it may not benefit the consumer in so far as the lumpsum tax will make no difference to the marginal cost curve of the producer. Now assuming that the marginal revenue curve remains what it is (and there is no reason why it should change because of the tax on the producer), the point of intersection of marginal cost and marginal revenue curves will remain unchanged. As a consequence, the maximum profit output of the producer will also remain unchanged. Since the average revenue curve will also be the same as before, the price charged from the consumers will remain unchanged. Thus an attempt to control oligopoly profit through the lumpsum tax would not result in either a higher output of the commodity or lower price. Consumers, therefore, cannot be said to benefit from such an attempt to deal with an oligopolistic market structure. The best solution would be to try to create conditions in which entry of new firms into the market is facilitated.

A consequence of oligopoly is said to be its aggravating influence on inflation. We have already seen while discussing the notion of the kinked demand curve that oligopoly price tends to be rigid. The same tendency would persist if oligopoly price is fixed on the basis of full-cost pricing principle and the average cost curve of the producer is flat at the bottom for a considerable range of output. Now this sickness in the price charged by an oligopolist begins to affect the price situation if new firms are kept out and there is no competition and the producers collude to keep the price high avoiding a price-war. Naturally the price of the concerned commodity would not come down at all. In fact, the more the commodities which are produced in an oligopolistic market, the more it will be that the general price level, in so far as it is affected by the prices of these commodities, will tend to be high rather than low. This will result in what is known as the phenomenon of creeping inflation. The existence of oligopoly makes downward swings in prices difficult because the oligopolists scrupulously avoid competition for fear of price war and of the threats to their own survival.

A really beneficial effect of oligopoly is product differentiation, innovation and technological change. We have already noted in discussion of monopoly that because of the large resources at the monopolist's command, he can encourage research and innovation and the society gains not merely in terms of new products but also in terms of new methods of production. An oligopolist also can do the same. The only snag is that there is no compulsion for the monopolist or the oligopolist to be innovative. Particularly, if the oligopolists join hands together to charge a common price and to share the market even if it involves idling and waste of resources, there can be no compulsion for innovation. However, to the extent to which oligopolists do choose to be innovative, oligopoly can prove beneficial for the society,

Check Your Progress B

1) What do you mean by collusion of oligopolists?

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2) Define price leadership.

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3) State whether the following statements are **True** or **False.**

   i)   A kinked demand curve indicates price rigidity.

   ii)   In formal collusion one price should be charged by all oligopolists.

   iii) In an oligopolistic market resources are most efficiently utilised.

   iv) Collusion under oligopoly is formal only.

   v)   Oligopoly has aggravating influence on inflation.

4) Choose the appropriate answer among the given alternatives.

   i)   In oligopoly the number of sellers is

      a)   more than one but less than eight

      b)   more than eight but less than twenty

      c)   only one seller

      d)   no restrictions on seller's number

   ii) In oligopoly, price determination is

      a)   easier than monopoly

      b)   difficult than monopoly

      c)   as good as monopoly

      d)   no comparison with the price of monopoly

   iii) In conditions of perfect oligopoly, equilibrium becomes

      a)   easier

      b)   less difficult

      c)   more difficult

      d)   no comparison

   iv) In arriving at average and marginal cost curves an oligopolist has to face

      a)   easy task

      b)   great difficult task

      c)   does not feel any problem

      d)   cannot be said anything

16.8   LET US SUM UP

Amongst the situations of imperfect competition, there is one which poses a serious challenge to the theory of value. This is the market structure called oligopoly. The source of the challenge is the fact that no seller under oligopoly can be sure of the demand curve which he faces or of the cost curve of his commodity, since even the quality of the commodity he will end up with is not entirely a matter of his decision. With a different quality, there would be a different cost curve to reckon with. All this uncertainty is due to oligopolists being so much 'interdependent' rather than 'independent'. No other market structure is characterised by such 'interdependence'. A consequence of uncertainty is that oligopolists try to avoid entering into

competition with one another. Particularly they try not to have a price-competition because no price which one seller fixes will be left unmatched by the others. So oligopolists often prefer to collude rather than compete, collusion can be formal or informal. In formal collusion, they fix up one price which all should charge. This price is determined in such a way that the joint profit of all oligopolisticfirm in the market is maximised. The marginal revenue and marginal cost curves of individual firms are summed up to give us an 'aggregate' marginal revenue curve and 'aggregate' marginal cost curve. It is the intersection of these two 'aggregate' curves which is then used to determine the appropriate price at which profit will be maximum. When collusion is informal, price is determined by a price leader. A price leader could be both a large firm or a small firm depending on the criterion the oligopolist likes to apply to the choice of their 'leader'.

One suggestion is that provided we postulate a kinked demand curve, we can fix the price with the help of marginal revenue and marginal cost curve. All that such a curve necessitates is the assumption that oligopoly market tends to be characterised by price rigidity.

Another suggestion is that we can ignore marginal cost, marginal revenue curves altogether. The long period average cost curve of a producer remains flat at the bottom for a considerable range of output. Therefore, by applying the full-cost pricing principle, we can fix up a price which is not only equal to long period average cost but also tends to be rigid over time.

Each of these solutions has problems on account of which we cannot claim to have a satisfactory theory indicating a truly determinate price and output equilibrium under oligopoly. Oligopoly output generally stops short of the level of optimum production. Further, the existing firms collude and try to keep potential firms out. The result is a continuing idle capacity and waste of resources in the system.

16.9 KEY WORDS

Cartel: A case of formal collusion in which price of the commodity and sharing of the markets are commonly decided but the organisational control of a firm is in its own hands.

Collusion: The coming together of oligopolistic firms to avoid competition amongst themselves.

Formal Collusion: A collusion which is based on a formal agreement.

Informal Collusion: A collusion behind which there is a broad understanding amongst the participants but no formal agreement.

Interdependence: The situation in which a seller does not feel free to take business decisions without duly considering the reactions of his rivals.

Joint Profit Maximisation: When colluding firms' marginal revenue and marginal cost curves are separately summed up and then intersected to find a price enabling maximum surplus for all of them together.

Kinked Demand Curves: A seller faces a demand curve in which increase in price above a particular level makes his demand more elastic but decrease in price does not do so.

Merger: A formal collusion in which not only the price and market sharing are commonly decided; even the control of individual firms is centralised.

Oligopoly: When the number of sellers is so small (more than one but less than eight) that each one of them influence the market price, quality and output powerfully.

Price leadership: When oligopolists decide that the market price be set by some particular firm and they follow that firm to charge the same price.

16.10 ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

4   i) False ii) False iii) True iv) True v) True

Check your progress B

3   i) True ii) True iii) False iv) False v) True

4   i) a ii) b iii) c iv) b

16.11 TERMINAL QUESTIONS

1) What is interdependence in an oligopolistic market? What kind of problems does it creates for oligopoly equilibrium?

2) What is joint profit maximisation? How is it sought to be achieved underoligopoly?

3) Explain the concept of price leadership. Does acceptance of price leadership solve all problems of oligopoly equilibrium?

4) A kinked demand curve may help to understand why oligopoly price tends to be rigid but it does not lead to determinate equilibrium. Comment.

5) Either the full-cost pricing principle ignores profit maximisation or it keeps it in view in a most arbitrary or ad-hoc way. Do you agree? Give reasons for your answer.

> **Note: These questions will help you to understand the unit better. Try to write answers for them. But do not send your answers to the University. These are for your practice only.**

BLOCK 5
DISTRIBUTION OF INCOME

BLOCK 5   DISTRIBUTION OF INCOME

In Block 4 you learnt about the equilibrium concept and the determination of price under perfect, monopoly, monopolistic competition and oligopoly. Another important aspect of economic theory relates to the distribution of income. In this block which consists of 4 units, you will learn about various approaches to the distribution of income, the theories of distribution and the concepts of wages, interest, rent, profits and inequality of income.

Unit 17   explains about factor Markets and its types, demand for factors, supply for factor demand, Backward bending supply curve and also the concept of brined demand.

Unit 18 explains various approaches to the distribution of income, the classical theory of distribution and the marginal productivity theory.

Unit 19 deals with the significance of collective bargaining in the determination of wages and various approaches to the determination of rate of interest.

Unit 20 explains various theories of rent, the concepts of economic rent, transfer earnings and quasi rent, and also the concept of profit and the various sources of profit.

UNIT 17   FACTOR MARKETS

Structure

17.0   OBJECTIVES

After studying this unit, you should be able to:

* Determine a factor market.

* Describe the anatomy of the markets for labor, capital and land.

* Define the concept of derived demand

* Explain the concept of backward supply curve.

* Explain how the value of marginal product determines the demand for a factor of production.

* Explain how factor prices are determined.

* Explains the types and operations of Factor Market.

17.1   INTRODUCTION

If we look around, we find people engaged in various activities, viz., agriculture, trade, business, industry, etc. The motive behind these activities is to earn money for the satisfaction of the wants. The activities performed for the money sake are called economic activities. Economic activities form the subject matter of economics. The form of economic activity is production. Production is the process by which inputs are transformed into 'output'. There are various inputs like land, labor, capital both physical & human and organization. The concept of production function plays a significant role in

the theory of production. It brings outrelationship between inputs used and the resulting output.

Based on the economic activities of economy we can define that a factor market is a market where factors of production are bought and sold. Factor market allocates factors of production, including land, labour and capital, and distribute income to the owners of productive resources, such as wages, rents, etc.

We should be able to differentiate between production function and factor markets.

In the words of Prof. Evans Douglas, Production Function is a technical specification of the relationship that exists between the input and the output in the production process.

A production function relates the maximum quantity of output that can be produced from given amounts of various inputs for a given technology.

Thus, Production Function involves:

- Maximum output that can be produced.

- Given amounts of various inputs, such as labour, land and capital etc.

- A given technology.

Factors of production in production function may be stated in an equation form, graph or schedule. If there is any change in technology, such as automation equipment, use of new and sophisticated machinery, use of skilled labour in place of unskilled labour, etc. there will be change in a production function and a new production function with change in factors of production takes place.

Production is an important economic activity, which directly or indirectly satisfies the wants and needs of the people. Their standard of living depends on the volume and variety of goods produced. Its level of production judges richness or poverty of the nation and performance of the economy. Those nations, which produce commodities and commodities and services in large quantities, are considered rich and others, which produce less, are considered poor.

17.2 DETERMINATION OF A FACTOR

In factor markets, sale & purchase of factors of production like land, labour, capital takes place. These factors of production along with entrepreneur, interact to produce goods and services in an economy. A firm is an organization transform inputs, known as factors of production into output. The inputs or the factors of production can be classified into two broad categories: -

- Human resources:- Labour, human capital including entrepreneurship are human resources

- Capital resources: - Land, machinery man-made capital, forests, rivers, etc. are the capital resources.

Conventionally in the process of production there are four major factors of production i.e.land, labour, capital (man-made) and entrepreneurs (organization). Generally households own or control these factors of production and sell them to firms. Households earn by selling these factors of production in the factors markets and thus contribute positively to the production process.

Land

Land is a primary factor of production. In economics, includes all those things which are found under and on the surface of the earth. Land is a free gift of nature. It is neither produced nor is man-made resource. Unlike other factors of production, land cannot be easily destroyed. It is permanent or fixed in existence. The remuneration paid for land is rent.

Labour

Labour is an important factor of production. In ordinary sense, labour means people at work for monetary gain. The remuneration paid for labour is wages.

Capital

The third factor of production is capital or physical capital. Physical capital refers to the cash or assets that are used in further production of goods and services such as plant/ machinery, tools, raw materials, etc. These goods are not significantly consumed, though they may depreciate in the production process. The remuneration paid for capital is interest.

Organization

This factor of production may refer as organization, entrepreneurship, human capital. The entrepreneur uses his /her intellect and knowledge to combine all the three factors of production- land, labour and capital in an optimum manner so as to earn maximum profit.

Any firm hires land, labour, capital and organization for production and simultaneously, there is payment to factors of payment in the form of wages, rent, interest (capital rental) and profit, respectively. This process is explained in Figure1.This process is also known as factor income, wage for labour, rent for land, interest for capital and profit to organization. The function of the firm, thus, is to purchase resources or inputs of labour services, capital and raw materials in order to convert them into goods and services for sale. The process can be shown in Figure1.

Household sector supplies land, labor, capital, and organization to the firm and in return the firm makes payment in the form of rent, wages, interest and profit to the household and household spends this income in buying goods and services from firm.
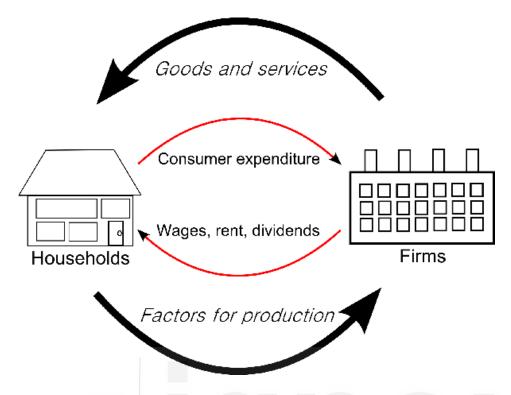
Figure 17.1:Factor Payment

17.3 DEMANDS FOR FACTORS

The factor demand curve is determined based on the quantity of a factor demanded at factor prices by firm. All factors of production are scarce resources therefore labor, capital, land, and entrepreneurship, have factor demand curves.

Along with demand of these factors of production by a firm, there is supply of these factors of production by households and based on their demand and supply their prices of these factors are determined. Like other demand curves, the factor demand curve is generally negatively sloped. The inverse relationship between demand and factor prices are associated with smaller quantities demanded and lower factor prices go with larger quantities demanded.

An important distinction between demand for goods and demand for factors is with regards to utility. While on one hand, consumers demand goods as they derive utility from its consumption, on the other hand, firms do not demand factors of production operations using the four factors of production. The purpose is to maximize revenue and gains from production using factors of production

In a perfectly competitive market, factor demand curve is also known as the marginal revenue product curve. Monopsony and other imperfectly competitive firms with some degree of market control over the factor market do not have a clear-cut factor demand curve. In other words, factor price and quantity demanded may or may not be inversely related.

The Figure 2below shows a negatively sloped demand curve. The number of workers is measured on the horizontal axis and the wage paid per worker is

measured on the vertical axis. This factor demand curve indicates that firm is willing to hire moreworkersat lower wages and if wage rate is higher than lesser workers are hired. This establishes negatively sloped and inverse relationship of demand curve.

The wage declines with an increase in the number of workersemployed, because extra workers contribute less and less and less to total production and to total revenue. Therefore it is also known as marginal revenue product curve. The primary reason for this inverse relation between wage and quantity demanded is the productivity of the workers and the law of diminishing marginal returns**.**
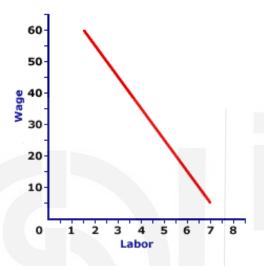
Figure 17.2 Negatively Demand Curve

As firm employs more workers, marginal product declines, each additional worker contributes less to total product as the law of diminishing marginal returns kicks in. However, with less production to sell, firm generates less revenue. In other words, the law of diminishing marginal returns causes a decline in marginal physical product, and consequently a decline in marginal revenue product. But if workers generate less revenue, then firm is willing and able to pay a lower wage.

Because the factor demand curve, like other curves, is constructed to reflect the relationship between two variables, factor price and factor quantity demanded, changes in other variables cause the curve to shift. The three most noted curve-shifting factor demand determinants are product price, factor productivity, and prices of other factors.

Calculating the value of Marginal Physical Product (MPP), Value of Marginal Product and Marginal Revenue Product

Based downward sloping demand curve as shown in Figure 2, we can define the marginal physical product (MPP) of a factor of production (like labour) is the additional output produced when an extra unit of that factor of production (worker) is added. Other factors of production remaining constant. In brief we can also say that:-

MPP= Changes in Total Product/ Change in number of units of factors of production

We can also say that the concept of Value of Marginal Product (VMP) also known as Marginal Value Product. We can find the value of output by using information on market prices. Thus, when prices of a product are multiplied with the marginal physical product of a factor of production, one can derive value of marginal product.

VMP= Price of output x Marginal Physical Product of a factor

We know that marginal revenue product is the additional revenue due to hiring of an additional worker. We can therefore calculate:-

MRP = Change in Total revenue/ Change in number of units of a factor of production

MRP = Marginal Revenue x Marginal Physical Product

We can also explain by examplesto understand the concept better. The first two columns of the table below are the firm's total product schedule. To calculate marginal product, find the change in total product as the quantity of labor increases by 1 worker.

Table 17.1

	Quantity of Labour (Workers)	Total Product (car washes per hour)
A	0	0
B	1	5
C	2	9
D	3	12
E	4	14
F	5	15

To calculate the value of marginal product, multiply the marginal product numbers by the price of a car wash, which in this example is Rs. 3.

Table 17.2

	Quantity of Labour (Workers)	Total Product (car washes per hour)	Marginal Product (washes per worker)
A	0	0	
B	1	5	} -5
C	2	9	} -4
D	3	12	} -3
E	4	14	} -2
F	5	15	} -1

We see the marginal product (washes per worker) reducing from 5 to 4 to 3 to 2 to 1 as the quantity of workers increase from 0 to 5.

Table 17.3

	Quantity of Labour (Workers)	Total Product (car washes per hour)	Marginal Product (washes per worker)	Value of marginal product (rupees per worker)
A	0	0		
B	1	5	} -5	15
C	2	9	} -4	12
D	3	12	} -3	9
E	4	14	} -2	6
F	5	15	} -1	3

Similarly, the value of marginal product (rupee per worker will also reduce from 15 to 12 to 9 to 6 to 3). This is due to law of diminishing returns shown in Figure17.3.

	Quantity of Labour	Value of marginal product (Rupee per additional worker
A	1	15
B	2	12
C	3	9
D	4	6
E	5	3
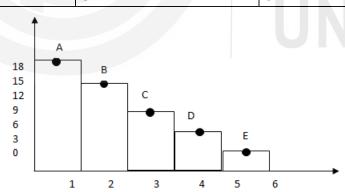
Figure 17.3: Quantity of hour and value of Marginal Product

The blue bars show the value of the marginal product of the labor that and number of hired based on their marginal productivity numbers in the table3 and shown in Figure 17.4.
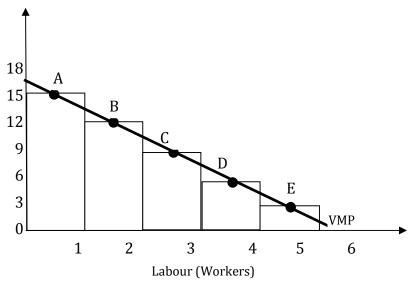
Figure 17.4 : Marginal Product of labour and their marginal productivity

The orange line is the firm's value of the marginal product of labor curve. A firm hires labor up to the point at which the value of marginal product equals the wage rate. If the value of marginal product of labor exceeds the wage rate, a firm can increase its profit by employing one more worker. If the wage rate exceeds the value of marginal product of labor, a firm can increase its profit by employing one fewer worker. A firm's demand for labor curve is also its value of marginal product curve. If the wage rate falls, a firm hires more workers.
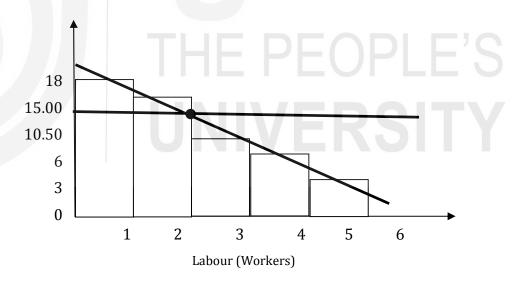
Figure 17.5

At a wage rate of Rs.10.50 an hour, firm makes a profit on the first 2 workers but would incur a loss on the third worker.

So at this point quantity of labor demanded is 2 workers.

We have observed that here demand for labor curve is the same as the value of marginal product curve and the demand for labor curveslopes downward because the value of the marginal product of labor diminishes as the quantity of labor employed increases.

The demand for labor depends on several factors. Some important factors are given below:-

- **The price of the firm's output: -** If the price of a firm's output is higher accordingly the demand for labour would also be higher and if output prices in market is lower accordingly demand for labour will also lesser.

- **The prices of substitutes factor of production:** - If the price of using capital decreases relative to the wage rate. In this case substitution effect will come into operation. A firm likes to substitutes capital for labor and increases the quantity of capital it uses. Usually, the demand for labor will decrease when the price of using capital falls.

- **Technology:** - Digitization and new technologies are also important to impact the demand for labour. New Technologies decrease the demand for some types of labor and increase the demand for other types.

17.4   SUPPLY FOR A FACTOR DEMAND

The supply of labour is defined as the amount of labour, measured in person-hours, offered for hire during a given time-period with given population.

A supply curve is a relationship between two, and only two, variables: quantity on the horizontal axis and price on the vertical axis.

A typical supply curve shows an increase in supply as wages rise. It slopes from left to right. However, in labour markets, we can often witness a backward bending supply curve. This means after a certain point, higher wages can lead to a decline in labour supply. This occurs when higher wages encourage workers to work less and enjoy more leisure time.

The Supply of Labor

People supply labor to earn an income. Many factors influence the quantity of labor that a person plans to provide, but the wage rate is a key factor. But decision about how much labour to supply is choice between consumption and leisure. Consumption is essential for survival and for availing consumption income to be earned but how much income is required to support consumption, this is an individual decision. Leisure implies the time available to a person when not working. By giving up leisure, a person receives additional income and this enables him/her to increase consumption. On the other hand, by working less, and giving up some consumption, a person enjoys more leisure. In economic terms, deciding whether to work at any given wage depends on the cost-benefit principle. The willingness to supply labour is greater when the wage rate is higher. This results into upward slope of supply curve up to a point and bends backward supply curve. This relationship is depicted in Figure 17.6 with the support of table.

Table 17.4

	Wage rate (Rupees per hour)	Quantity of labour (Hours per week)
A	40.00	30
B	35.00	35
C	30.00	38
D	25.00	40
E	20.00	38
F	15.00	35
G	10.50	30
H	5.00	0
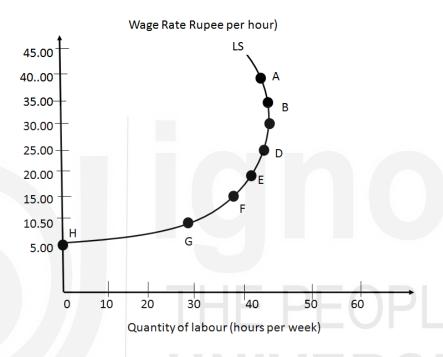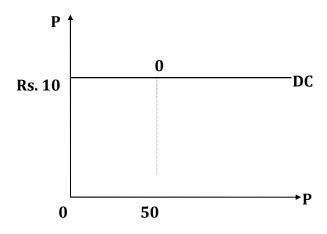
Figure 17.6: An individual's labor supply curve

At a wage rate of Rs.10.50 an hour, An individualsupplies 30 hours of labor a week. As the wage rate rises, quantity of labor supplied increases, reaches a maximum, then decreases. Therefore we can say that labor supply curve eventually bends backward.

Market Supply Curve
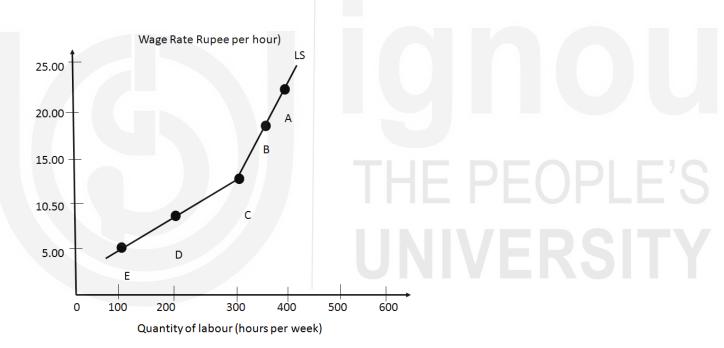
A market supply curve shows the quantity of labor supplied by all household sector in a particular job. It is found by adding together the quantities of labor supplied by all households at each wage rate.

The supply of labor is not affected by the fact that firms have monopolistic power. Market supply of labour is the summation of the supply curves of individual firm faces is however perfectly elastic and that of the market is positively sloped at a given wage rate **Figure 17.7(a)**

Figure 17.7(a)

The Figure -7(b) below shows the supply of car wash workers. In a market for a specific type of labor, the quantity supplied increases as the wage rate increases, other things remainingthe same.

Figure 17.7(b)

Influences on the Supply of Labor

However adult population, preferences and time in school and training have impact on supply of labor. Any increase in population specifically adult population will increase the supply of labour. More people are engaged in education & training will affect the supply of low skilled workers

Labor Market Equilibrium

Labor market equilibrium determines the wage rate and employment.The Figure 8below illustrates equilibrium in the market for car wash workers.
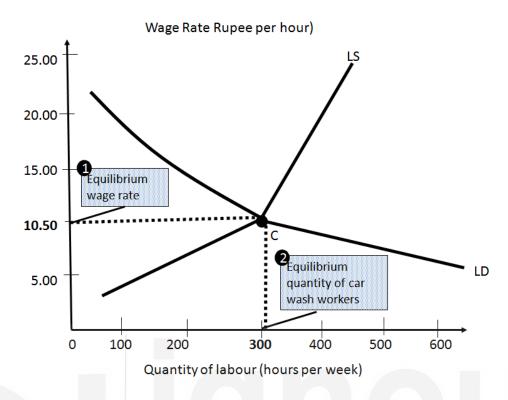
Figure 17.8 Labour Market Equilibrium

The equilibrium wage rate is Rs. 10.50 an hour and the equilibrium quantity of labor is 300 workers.

If the wage rate exceeds Rs.10.50 an hour, the quantity demanded is less than the quantity supplied and the wage rate falls.If the wage rate is below Rs.10.50 an hour, the quantity demanded exceeds the quantitysupplied and the wage raterises.

17.5 BACKWARD BENDING SUPPLY CURVE

As explained in the unit above the shape of a labour supply curve can be regarded as a Backward Bending Supply Curve. A backward-bending labour supply curve, is a graphical device showing a situation in which as real wages increase beyond a certain level. This is shown in Figure 17.9. The increase in real wages will lead to both income and substitution effect. We are aware that the income effect states that a higher wage means workers can achieve a target income by working fewer hours. Therefore, if wages increase, it becomes easier to get enough income through working fewer hours. They like to substitute further increase in income by substituting with leisure. We are aware that the substitution effect states that a higher wage makes work more attractive than leisure. Therefore, in response to higher wages, supply increases because work gives greater remuneration.

Higher wages will substitute leisure for paid worktime. This will lead to a decrease in the labour supply and so less labour-time being offered for sale. The "labour-leisure" trade-off is faced by wage-earning human beings between the amount of time spent engaged in wage-paying work and satisfaction-generating unpaid time, which allows participation in "leisure"

activities and the use of time to do necessary self-maintenance, such as entertainment and sleep. This implies a positively sloped labour supply curve. But the backward-bending labour supply curve occurs when an even higher wage actually entices people to work less and consume more leisure or unpaid time.

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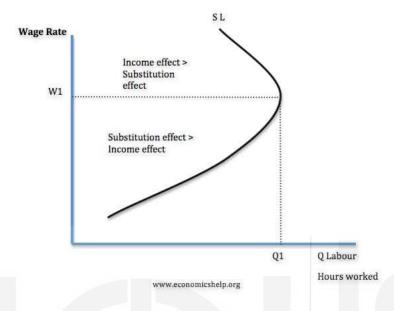
Figure 17.9: Backward bending supply curve

There are two effects related to determining supply of labour.

When does the labour curve begin to slope backwards?

It will depend on an individual. For example, if an individual has   modest demands of goods and services and also keen to spend time in leisure pursuits. His goal may be to gain Rs. 30,000 a year and then after that maximize leisure time. In this case, after wages increase above Rs. 30,000, the income effect dominates, and with higher wages, he can afford to have more time off work. Similarly, due to substitution effect an individual will do large in satisfying his demand of goods and services and little interest in leisure pursuits. If wages increase, it gives an increased incentive to work longer hours as he can gain increased income and buy more goods.

17.6   CONCEPT OF DERIVED DEMAND

The concept of derived demand is an important concept to decide the demand for each of the factors of production. This emphasize the fact that the relationship between the factors price and the quantity of the factor demanded by the firms employing it in production is directly dependent on the consumer's demand for the final product the factor is used to produce. The concept was developed by Alfred Marshall with two assumptions:*First, production conditions, the demand curve for the final good, and the supply curves for all other factors of production are held constant. Second, competitive markets for the final good and all other factors of production are always in equilibrium.*

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"Derived demand refers to the demand for any goods or services, which is derived from any related goods, services, or intermediate goods or services. In the case of derived demand, a market can exist for both intermediate and related goods or services"

The derived demand curve answers the question what quantity, x, of the selected factor of production would be demanded at an arbitrary price, y, under the above conditions. The inverse of the relationship, $y = f(x)$, is the graphical representation of Marshall's derived demand curve for the selected factor of production. Its equilibrium price and quantity are determined by the intersection of this demand curve with the supply curve of the factor of production.

Derived demand influences the market price of the derived goods. Derived demand for any goods or services also creates demand for related or incidental goods. Hence, derived demand is dependent on the demand for an intermediate good or service. Derived demand can also be for one of the factors of production, such as raw materials, land, labour, capital. For example, the demand for raw material is directly related to the demand for the final product. The derived demand for a product or service can be strategically used to anticipate the demand for related goods. The products or services may be from two different sectors where one sector's output is the input for the other sector. An increase in demand or business activity in one sector would spur business activity in another sector. A couple of examples to understand 'Derived demand' is the 'pick-and-shovel-strategy', where investment is made in the technology required to produce certain goods and services. One can assess the demand for 'engineering services' based on the demand for precision instruments and the business activity in the precision engineering industry.

Similarly, the demand for computer and in the area of computer peripherals, such as a mouse, keyboard, monitors, motherboards, batteries, graphic cards, and supporting materials would be based on the demand for computers and an increasing trend towards adoption of technology. In these two examples, the demand for the accessories or supporting goods enables estimation of demand for the end product and service.

If for some reason say, for example a spontaneous shift in consumer tastes the demand for cars increases (shifts to the right) so that more cars than before can be sold at any given price, then the derived demand for iron-ore used in making cars will also increase (shift to the right) so that more iron ore will be demanded at any given prices. We would also expect car demand for the labor of car makersand for specialized car making machinery to shift to the right in a similar fashion in response to the public's greater demands for cars.

Derived Demand

- The demand for resources are derived from the products they produce.
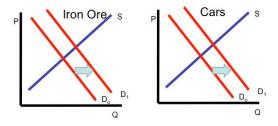
Figure 17.10: Derived Demand

What is the mechanism by which a shift in demand for the final product is translated into a shift in demand for the factors of production used in its manufacture? The key is the change in the price of the final product brought by the shift indemand for it. If the demand curve for hats shifts to the right and the upwardly sloping supply curve remains unchanged, then the equilibrium price and the quantity in the hat market will now involve both a somewhathigher price for hats and a somewhat larger quantity of hats being produced. But producing more hats will require more of the relevant factors of production than before which they will want to purchase from their suppliers shifting the demand curve for each of the factors to the right.This increase in demand for the factors in turn will tend to raise the factor prices somewhat and to increase the quantity of them sold, which then affects the factor producers demand for their own necessary inputs and brings about further price and quantity adjustments throughout the economy in an ever-widening ripple effect.This is shown in Figure 17.10.

17.7 ELASTICITY OF FACTOR DEMAND

We know that the firm demands factor services not for direct consumption for firm but as a means of productionby which firm make a profit. By hiring these factors of production firm can produce something the consumers are willing to buy and are ready to pay for.

Since it is the consumer's wish to buy products that causes firm to buy factors of production, the firm demand for input is said to be a derived demand (derived from the consumer's demand for the product). The input-price elasticity of the producer's demand for factors may, therefore, be referred to as the elasticity of derived demand.

17.8 MARKET EQUILIBRIUM AND FACTOR PRICE DETERMINATION

According to the modern theory, the price of a factor of production is determined at a point where the demand and supply curves of

the factor intersect each other. This point is known as equilibrium point, where the demand of a factor is equal to its supply.

The production function of a firm is a relationship between inputs used and output produced by the firm. For various quantities of inputs used, it gives the maximum quantity of output that can be produced.

Production is the transformation of inputs into the output of a commodity or several commodities (in case of point production) in a specific period of time at the given state of technology

Production enhances the utility of product by using factors of production. Distribution through transportation increases the usefulness of the product by bringing it to the location where the consumer needs it. The question of how much can be produced by using factors of production is largely an engineering and managerial problem. The question of how much should be produced is an economic issue. The producer is confronted with a choice about resource utilization. The behavioral choice will be influenced by profit-and-loss calculations. The end results will be a supply decision, that is, an expressed ability and willingness to produce a good at various a good at various prices. Therefore Supply is the ability and willingness to sell (produce) specific quantities of a good at alternative price in a given time period, ceteris paribus.

Production - Function - A production function tells us the maximum amount of output attainable from alternative combinations of factor inputs. This particular function tells us how many pairs of jeans we can produce in a day with a given factory and varying quantities of capital and labour. With one sewing machine, and one operator, we can produce a maximum of 15 pairs of jeans per day. To produce more jeans, we need more labour or more capital. The output of any factor of production depends on the amount of other resources available to it. Mathematically, the production function can also be shown as:

$Q = f(X_1, X_2.............X_K)$
Where Q= Output
$X_1................. X_K$ =Input used.
For the purposes of analysis, the equation can be reduced to two inputs X and Y. Restating,
$Q = f(X,Y)$

Where $Q = f(X, Y)$

Where Q= Output
X= Labor
Y= Capital

Law of Variable Proportion

As more and more of the factor input is employed, all other input quantities constant, a point will eventually be reached where additional quantities of varying input will yield diminishing marginal contributions to total product.

"The Law of Variable Proportion states that as the quantity of a factor is increased while keeping other factors constant, the Total Product (TP) first rises at an incremental rate, then at a decremental rate and lastly the total production begins to fall."

In this example, the land is the fixed factor and labour is the variable factor. The table shows the different amounts of output when you apply different units of labour to one acre of land which needs fixing.

Table 5

Fixed Factor : Land (Acres)	Variable Factor: Land (Units)	TPP (Total Physical Product) (Quantity)	MPP (Marginal Physical Product) (Quantity)	
1	0	0	-	
1	1	2	2	Stage I
1	2	6	4	
1	3	12	6	
1	4	16	4	Stage II
1	5	18	2	
1	6	18	0	
1	7	14	-4	Stage III
1	8	8	-6	

The following diagram explains the law of variable proportions. In order to make a simple presentation, we draw a Total Physical Product (TPP) curve and a Marginal Physical Product (MPP) curve as smooth curves against the variable input (labour).

Three Stages of the Law

Stage I – The TPP increases at an increasing rate and the MPP increases too. The MPP increases with an increase in the units of the variable factor. Therefore, it is also called the stage of increasing returns. In this example, the Stage I of the law runs up to three units of labour (between the points O and L).

Stage II – The TPP continues to increase but at a diminishing rate. However, the increase is positive. Further, the MPP decreases with an increase in the number of units of the variable factor. Hence, it is called the stage of diminishing returns. In this example, Stage II runs between four to six units of labour (between the points L and M). This stage reaches a point where TPP is maximum (18 in the above example) and MPP becomes zero (point R).

Stage III – Now, the TPP starts declining, MPP decreases and becomes negative. Therefore, it is called the stage of negative returns. In this example,

Stage III runs between seven to eight units of labour (from the point M onwards).

It can be shown in a Table-5& Figure 17.11 as done below.

Table 5: The Three Stages of Production

Total Physical Product	Marginal Physical Product	Average Physical Product
Stage I		
Increases at an increasing rate	Increases and reaches its maximum	Increases (but slower than MPP)
Stage II		
Increases at a diminishing rate and becomes maximum	Starts diminishing and becomes equal to zero	Starts diminishing
Stage III		
Reaches its maximum, becomes constant and then starts declining	Keep on declining and becomes negative	Continues to diminishing but always be greater than zero
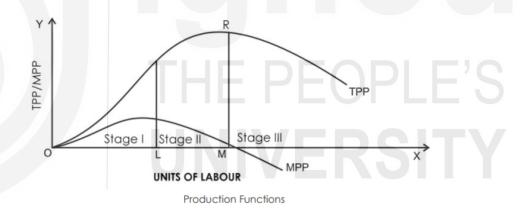
Figure 17.11: Law of Variable proportion

It is important for the firm to decide how much labour it should use in order to maximize profits. The firm should employ an additional unit of labour as the extra revenue generated from the sale of the output produced exceeds the extra cost of hiring the unit of labour, i.e.,Until the extra revenue equals the extra cost.

The extra revenue generated by the use of an additional unit of labour is called the marginal revenue product of labour (MRP^L). This equals the Marginal Product of Labour (MP^L) times the Marginal Revenue (MR) from the sale of the extra output produced.

Thus,

$(MRP^L) = (MP^L)(MR)$

Assumptions of the Law:

The law of variable proportions or diminishing returns, as stated above, holds good under the following conditions:

1. First, the state of technology is assumed to be given and unchanged. If there is improvement in the technology, then marginal and average products may rise instead of diminishing.

2. Secondly, there must be some inputs whose quantity is kept fixed. This is one of the ways by which we can alter the factor proportions and know its effect on output. This law does not apply in case all factors are proportionately varied. Behaviour of output as a result of the variation in all inputs is discussed under "returns to scale".

3. Thirdly the law is based upon the possibility of varying the proportions in which the various factors can be combined to produce a product. The law does not apply to those cases where the factors must be used in fixed proportions to yield a product.

Check your Progress A

1. Answer the correct option from the following:

    a. The law of variable comes into existence when:

        1. There are only two variable factors

        2. There is a fixed and a variable factor

        3. All factors are variable

        4. Variable factor yields less

    b. Labour supply curve is backward bending because:

        1. Labour prefer more income to leisure

        2. Labour prefer more leisure to income

        3. Substitution effect of increase in wage rate.

        4. Labour prefers more from small number of working hours.

    c. The marginal physical product of capital is the addition to

        1. Total revenue generated by adding a unit of loanable funds to production

        2. Total physical product generated by adding a unit of capital to production

        3. Total revenue generated by adding a unit of capital to production

        4. Total physical product divided by a unit of capital

2. Explain the assumptions to the law of variable proportion.

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17.9   FACTOR MARKET AND ITS TYPES

The major factors are: labor, capital, land and entrepreneurship. The first three factors listed are traded in the factor market where the equilibrium quantity of the factor and the factor price are determined. The entrepreneurship factor creates firms and hires the other factors. There are markets for labor, capital, or land.

Labor Markets

The labor market can be referred job market in modern terminology. In job market, there is collection of people and firms who are trading labor services. It also refers to the supply of and demand for labor, in which employees provide the supply and employers provide the demand.

Financial Markets

The term "financial markets" is often used to refer solely to the markets that are used to raise finance: for long-term finance, capital markets are used; for short-term finance (maturity up to one year), money markets are used.

Money Market

This include operation of financial capital for short period of time. In financial markets firms uses funds to buy and operate physical capital. Firm buy the tools, instruments, machines, and other constructions that have been produced in the past. Businessesalso use physical capital toproduce final goods and services for household. In money market, there is collection of people and firms who are lending and borrowing to finance the purchase of physical capital.

Capital Market

These are long-term and their maturity is greater than 1 year. For example, corporate bonds, treasury bonds (finance national debt), municipal bonds (finances substantial and long-term capital projects), stocks, mortgage loans, consumer loans & business loans. Buying and selling of bonds also happens in capital market because their maturity is greater than 1 year. Bonds issued by firms or government are also part of money market because in bonds there is a promise to pay specified sums of money on specified dates. Bonds are issued by firms or government are traded in financial market. Stock market is a market in which the shares in the stocks of companies. For examples, the New York Stock Exchange, NASDAQ, National Stock Exchange (NSE) and Bombay Stock Exchange (BSE)

The Demand for Financial Capital

A firm's demand for financial capital stems from its demand for physical capital to produce goods andservices. The quantity of physical capital that a firm plans to use depends on the price of financial capital which is the interest rate. There are two factors that change the demand for capital are population growth and technological change.

The Supply of Financial Capital

The quantity of financial capital supplied results from people's saving decisions. The higher the interest rate, the greater is the quantity of saving supplied. The main factors that influences the supply of saving are population, average income and expected future income.

Financial Market Equilibrium and the Interest Rate

In financial market interest rate is determined and equilibrium occurs when the interest rate has adjusted to make the quantity of capitaldemanded equal the quantity of capital supplied. The Figure 17.12 belowshowsthe financial marketequilibrium. The demand for financial capital is *KD*, and the supply of financial capital is KS. The equilibrium interest rate is 6 percent a year. The equilibrium quantity of financial capital is $200 billion.
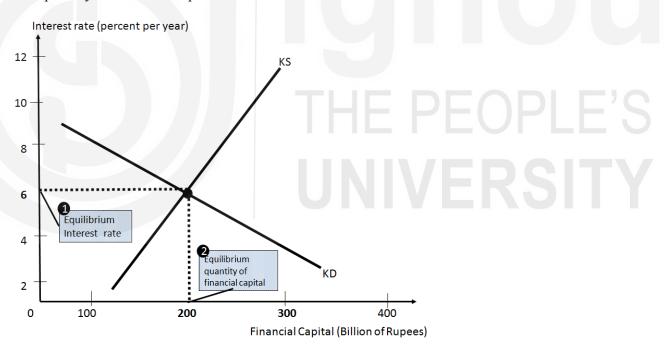

Figure 17.12 Financial market equilibrium and interest rate

Land and Natural Resources Markets

Land consists of all the gifts of nature. The markets for raw materials are called commodity markets.

All natural resources are called land, and they fall intotwo categories: Renewable and nonrenewable.

Renewable natural resources

Natural resources that can be used repeatedly also known as a flow resource. These are natural resource which will replenish to replace the portion depleted by usage and consumption, either through natural reproduction or other recurring processes in a finite amount of time in a human time. Solar energy, windenergy, hydro energy, tidal energy. geothermal energy and biomass energy are popular renewable resources

Nonrenewable natural resources

Natural resources that can be used only once and thatcannot be replaced once they have been used. It is a finite resource. Fossil fuels such as oil, natural gas, and coal are examples of non -renewable resources.

The Market for Land (Renewable Natural Resources)

The lower the rent, the greater is the quantity of land demanded. The supply of land is fixed therefore the supply of a particular block of land is perfectly inelastic. TheFigure 17.13 belowshows equilibrium of land market by taking into consideration demand and supply for land. The demand curve for a 10-acre block of land is D, and the supply curve is S. Equilibrium occurs at a rent ofRs.1,000 an acre per day.
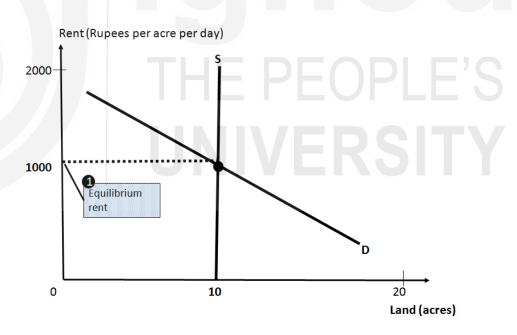
Figure 17.13: Equilibrium Rent

The Supply of a Nonrenewable Resource

Over time, the quantity of a nonrenewable resource decreases as it is used up.But the known quantity of a natural resource increases because advances in technology enable ever less accessible sources of the resource to be discovered. Using a natural resource decreases its supply, which causes price to rise.

New discoveries increase supply, which cause prices to fall.

17.10 LET US SUM UP

Production is an important economic activity, which directly or indirectly satisfies the wants and needs of the people. Their standard of living depends on the volume and variety of goods produced. Its level of production judges' richness or poverty of the nation and performance of the economy. Those nations, which produce commodities and commodities and services in large quantities, are considered rich and others, which produce less, are considered poor. The production function involves maximum output that can be produced, given amounts of various inputs, such as labour, land and capital and a given technology.

The inputs or the factors of production can be classified into two broad categories: Human resources: - Labour, human capital including entrepreneurship are human resources and Capital resources: - Land, machinery man-made capital, forests, rivers, etc. are the capital resources.

The factor demand curve is determined based on the quantity of a factor demanded at factor prices by firm. All factors of production are scarce resources therefore labor, capital, land, and entrepreneurship, have factor demand curves.

The supply of labour is defined as the amount of labour, measured in person-hours, offered for hire during a given time-period. Taking population as given. A supply curve is a relationship between two, and only two, variables: quantity on the horizontal axis and price on the vertical axis. A typical supply curve shows an increase in supply as wages rise. It slopes from left to right. However, in labour markets, we can often witness a backward bending supply curve. This means after a certain point, higher wages can lead to a decline in labour supply. This occurs when higher wages encourage workers to work less and enjoy more leisure time.

A market supply curve shows the quantity of labor supplied by all households in a particular job. It is found by adding together the quantities of labor supplied by all households at each wage rate.

The shape of a labour supply curve can be regarded as a Backward Bending Supply Curve. A backward-bending labour supply curve, is a graphical device showing a situation in which as real wages increase beyond a certain level.

Derived demand refers to the demand for any goods or services, which is derived from any related goods, services, or intermediate goods or services. In the case of derived demand, a market can exist for both intermediate and related goods or services.

According to the modern theory, the price of a factor of production is determined at a point where the demand and supply curves of the factor intersect each other. This point is known as equilibrium point, where the demand of a factor is equal to its supply.

The Law of Variable Proportion states that as the quantity of a factor is increased while keeping other factors constant, the Total Product (TP) first

rises at an incremental rate, then at a decremental rate and lastly the total production begins to fall.

Land consists of all the gifts of nature. The markets for raw materials are called commodity markets. All natural resources are called land, and they fall into two categories: Renewable and non-renewable

17.11 KEYWORDS

Production: Producing means to manufacturing or creating a product or good from raw materials.

Law of Variable Proportion: The Law of Variable Proportion states that as the quantity of a factor is increased while keeping other factors constant, the Total Product (TP) first rises at an incremental rate, then at a decremental rate and lastly the total production begins to fall

Labor Market Equilibrium: Labor market equilibrium "balances out" the conflicting desires of workers and firms and determines the wage and employment observed in the labor market.

Backward bending of supply curve of labour: A backward-bending supply curve of labour, or backward-bending labour supply curve, is a graphical device showing a situation in which as real (inflation-corrected) wages increase beyond a certain level, people will substitute leisure (non-paid time) for paid worktime and so higher wages lead to a decrease in the labour supply and so less labour-time being offered for sale.

17.12 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress A

1.   a.2, b.3, c.2

17.13 TERMINAL QUESTIONS

1)   Describe the anatomy of the markets for labor, capital, and land.

2)   Explain how the value of marginal product determines the demand for a factor of production.

3)   Explain how wage rates and employment are determined.

4)   Explain how interest rates, borrowing, and lending are determined.

5)   Explain how rents and natural resource prices are determined.

6)   What is backward bending supply curve? Explain with an example.

> **Note: These questions will help you to understand the unit better. Try to write answers for them. But do not send your answers to the University. These are for your practice only.**

UNIT 18 FUNCTIONAL DISTRIBUTION OF INCOME

Structure

18.0 OBJECTIVES

After studying this unit, you should be able to:

- describe various approaches to distribution of income
- discuss the classical theory of distribution
- explain the marginal productivity theory.

18.1 INTRODUCTION

Production is carried out by the collective efforts of land, labour, capital and enterprise. These factors of production are combined in different productive activities in different proportions. Therefore, their relative shares in the joint income are not the same in all areas of production. For example, land has a predominant role in agriculture. The other factor which contributes no less than land to agricultural output is labour. Therefore, remunerations to these

factors of production are larger than those of other factors of production in agriculture. In industries, on the contrary, much capital has to be employed and the entrepreneur performs a very useful function. In fact, his contribution to output of an industrial firm is generally quite substantial. While the role of land in industries is relatively secondary, labour's contribution to industrial output is always large. These facts explain why the shares of labour, capital and enterprise in the incomes of industrial units are large, whereas land's share is small. These differences in the relative shares of the various factors of production in different productive activities, however, do not affect the criteria on the basis of which they are rewarded. The principles according to which land, labour, capital and enterprise are remunerated are the same for all productive activities. In this Unit, you will learn various approaches to distribution of income. You will also learn classical theory of distribution and marginal productivity theory.

18.2 ALTERNATIVE APPROACHES TODISTRIBUTION OF INCOME

There are two main approaches to the problem of income distribution. One way to examine the income distribution is to study as to how the national income is distributed among the various members of the society. In this case, the sources from which people derive their incomes are not relevant; what is important is as to how much income different people have received. This is called 'Personal Income Distribution' The other way to examine the income distribution is to study as to how are different persons rewarded for their services, or the factors which they provide for the purpose of production rewarded. In this case, attention is given to the reward for the functions each factor performs in the processes of production.

18.2.1 Personal Distribution

Personal distribution of income means the distribution of national income among the various members of the society. These persons perform various kinds of activities and are paid for their services. For example, workers, teachers, clerks and other officers get salaries, and professionals like advocates, chartered accountants and physicians doing private practice charge fees for their services. Since these services do not require the same skill and are not uniformly productive, earnings of different persons engaged in these activities differ. But all persons do not work. Some persons own either land or capital or in some cases both. In the agricultural sector, a section of population owns land. These persons can either cultivate land or give it to others who pay rent. In the first case, that is, if land is tilled by the owner, the person's income is partly a reward for his labour and partly a reward for the services of land. The owner of capital earns interest. A person can lend his capital to others and earn interest, or he may invest it in his business where part of the income of the firm will be due to the services of the capital. Entrepreneurs bear risk and perform some organisational functions for which they are rewarded in the form of profit.

Incomes of a large number of people are not from one source only. Some people get salary for the work which they do in offices and also earn interest on their bank deposits and dividend on their investments in shares. Others earn income from agriculture and by working in informal sector when there is no work to be done on farms. These are some of the examples to underline the fact that a person can receive income in more than one form. In examining personal distribution, we are not concerned with the source or with the form of income. Our interest is confined only to the size distribution of income. Thus in this case, we analyze as to why income inequalities exist and is there something which can be done to make rich a little less rich and poor a little less poor.

18.2.2 Functional Distribution

Functional distribution refers to the mechanism whereby different factors are rewarded for the services they render to the productive process. We have stated earlier that wages are paid to labour, rent to owners of land, interest to owners of capital and profit to entrepreneurs. **In functional distribution, an attempt is made to examine how are wages, rent, interest and profit determined.** In this respect, it is necessary to state that there is no theory which could explain determination of the rewards of all the factors of production in an equally satisfactory manner. According to modern economists, rent, wages, interest and profit are the prices for the services rendered by land, labour, capital and enterprises respectively in the production process. They assert the problem of functional distribution in essence of the problem of factor pricing. The dichotomy between 'Commodity pricing' and 'Factor pricing' is, therefore, no longer recognized. It is now contended that the same principles which determine commodity prices go to determine prices of various factors of production. Having taken this position they consider pricing of factors of production as part of the price theory.

Check Your Progress A

1) Distinguish between the Personal distribution and the Functional distribution

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   …………………………………………………………………………
   …………………………………………………………………………
   …………………………………………………………………………
   …………………………………………………………………………

2) State whether the following statements are **True** or **False.**

   i) Production is carried out separately by land, labour, capital and enterprise.......

   ii) When one is primarily concerned with the size distribution of income, he is……………….. examining personal distribution.

iii) Under functional distribution, the primary concern is with respect to determination of rewards for the services rendered by various factors of production………………..

iv) Profit is earned by the capitalists for the services of capital in the production process. ………………..

v) Rent is paid to the entrepreneur for lending the money.

vi) Why do income inequalities exist is examined under personal distribution... ………………..

vii) The same principles explain both pricing of commodities and pricing offactors of production.

3 Fill in the blanks:

i) Rent is earned by the landlord for the services of ………………..

ii) .... is paid to the capitalists for the services of capital.

iii) .... earns profit for risk bearing.

iv) Workers earn .... for the functions performed by them in production process.

v) In examining ……………….we are concerned with size and distribution of income.

vi) In examining……………….we are concerned with the form of distribution.

18.3 THE CLASSICAL THEORY OF DISTRIBUTION

The earliest systematic discussion on distribution of income is found in the writings of the classical economists. Adam Smith and Ricardo were the most prominent economists of the classical school. These economists attempted to explain the prices of products in terms of so-called "Natural rates" of reward for labour, land and capital. These natural rates of reward were explained by special theories. Interestingly, even the leading classical economists did not wholly agree among themselves in explaining rent, wages, interest and profit and in some cases their differences were on substantial points. We shall confine here only to what are considered the representative theories of the classical school. For explaining rent Ricardo's theory is considered most authentic. There are two theories to explain wages. Adam Smith and David Ricardo developed the Subsistence Wage Theory. Some other classical economists, including J.S. Mill advocated the Wages-Fund Theory for explaining wage rates. Interest has been explained in terms of demand for and the supply of savings. Although the classical economists used the concept of profit in their writings, they failed to develop a consistent theory of profit.

18.3.1 Rent

As stated above on rent, the most authentic theory in the classical framework has been provided by David Ricardo who is considered one of the foremost

economists of the classical school. According to Ricardo, **Rent is that portion of the produce of earth which is paid to the landlord for the original and indestructible powers of the soil.** In his opinion, rent is not earned by the landlord by making certain improvements on land. It is a surplus left after the costs of cultivation as represented by payments to labour and capital have been met.

In developing his theory of rent, Ricardo relied on deductive reasoning. In his opinion, man must have cultivated the superior most quality land first, and until such a land was available rent could not arise. But in any country the best quality land cannot be available in unlimited quantity. Its supply exhausts with the increase in population. As population grows and the demand for food grains increases, people are compelled to bring the second best quality land under cultivation. Obviously, the production on this land which is now marginal land willnot be as much as on the best quality land. According to Ricardo, on the marginal land there cannot be any rent. Since the supply of this land is still abundant, the question of paying rent on this land does not arise. However, rent emerges due to the excess production on the best quality of land as compared to the marginal land. It will be equal to the surplus production on superior lands over and above the production on marginal land. In this sense Ricardo viewed, **Rent as a differential surplus that some plots of land earn over and above the least fertile land under cultivation.** You will learn more about this theory of rent in forthcoming Unit.

18.3.2 Wages

As mentioned earlier, the classical economists had developed two different theories of wage determination. Adam Smith and David Ricardo are considered the chief exponents of the Subsistence Wage Theory. T.R. Malthus and J.S. Mill propounded the Wages Fund Theory. Let us discuss them briefly.

The Subsistence Wage theory determination assumes that labour is purchased and sold in the market like any other commodity and its value is determined like the values of other commodities. Since the classical economists argue that in the long run the value of any commodity is equal to its production cost, therefore the value of labour should also be equal to the cost of producing it, which in essence is the amount required for maintaining the worker and his dependents at the subsistence level. The Subsistence Wage theory asserts that workers in the long run earn only the subsistence wage irrespective of their productivity levels. In the short run, however, actual wage rate can be at variance from the subsistence wage, but in the long run through adjustments in the supply of labour the actual wage rate will tend to be equal to the subsistence wage. Ricardo was of the view that the subsistence level of wages will be rigidly fixed for all times.

J.S. Mill had propounded the Wages Fund theory in most cogent form. According to him, **Wage rate depends on ratio of workforce to the amount of working capital which is meant to be spent directly on the purchase of labour.** The Wages fund, that is, the amount of working capital

provided for obtaining the services of labour is not in practice any fund set aside for paying the wages. The producers only have an estimate of it in their minds. The aggregate of these individual producers' estimates make the national estimate of wages fund which ordinarily remains fixed over times. Therefore, any change in the wage rate that may occur will be due to a change in the number of workers willing to work for wages. The Wages Fund theory does not suggest that in the long run wage rate should remain stable at a certain level. It admits that over time wage rate may rise either due to an increase in the wages fund resulting from higher savings or the decrease in the workforce. The possibility of both the factors operating simultaneously also exists.

18.3.3 Interest

J.S. Mill is the chief exponent of the classical theory of interest. In his opinion, **the Rate of Interest is determined by the interaction of demand for and the supply of capital.** He remarked that "the rate of interest ... depends essentially and permanently on the comparative amount of real capital offered and demanded in the way of loan", and thus "fluctuations in the rate of interest arise from variations either in the demand for loans or in the supply"

The classical theory of interest suggests that the source of supply of capital is that part of income which is withheld from consumption. This is called **Saving.** In the classical theory, saving is functionally related to interest and varies directly with it. The demand for capital is made for investment purposes only and is interest elastic. It implies that the demand for capital rises as the rate of interest decreases and it diminishes with the rise in the rate of interest. To be brief, the demand for capital varies inversely with rate of interest. The demand for and supply of capital are equal at a rate of interest which is obtained by the intersection of the demand and supply schedules.

18.3.4 Profit

The classical economists did not provide any coherent theory of profit. It was difficult for them because they had relied on labour theory of value for explaining the values of commodities. According to this theory, **the value of a commodity depends on the amount of labour embodied in it.** This might have been true in the earlier societies, when labour was the sole producer of commodities. Even in his times, Adam Smith noted that employers used their own capital along with the hired labour for producing commodities. He, therefore argued that when goods are sold they must fetch not only enough to cover the wages of workers but they must also bring in something by way of profit for their employers. Smith did not believe that profits may be a special type of wages, the reward for labour of inspection or supervision. In his opinion, profits bear relation to only the size of the capital stock of the employers. Ricardo, who also relied on labour theory of value, failed to explain adequately the origin of capitalist's profit. He argued that the value of commodities depends on both present and past labour. In this way, he incorporated capital into his system and found an explanation for profit.

To sum up, the classical theories which explain rent, wages, interest, and profit provide some insight into the distribution process but they are not entirely correct and, therefore, have been abandoned. Modern economists now assert that land alone does not earn rent. It can accrue to any factor of production. This approach you will learn later in subsequent Unit. Wages are determined neither by the subsistence level of workers nor by the wages fund. It is the marginal productivity of workers that decisively determines the wage rate. Since neither the saving, nor investment are interest elastic, the basic premise of the classical theory of interest is incorrect. Finally, the classical theory fails to explain why profits arise.

Check Your Progress B

1) Define Subsistence wages.

   …………………………..…………………………………………

   …………………………..…………………………………………

   …………………………………………………………………………

   …………………………………………………………………………

   …………………………………………………………………………

2) Distinguish between Rent and Interest.

   …………………………………………………………………………

   …………………………………………………………………………

   …………………………………………………………………………

   …………………………..…………………………………………

   …………………………………………………………………………

3) State whether the following statements are **True** or **False.**

   i) According to Ricardo, rent is paid to landlord for the improved fertility of the land.

   ii) Marginal land is the least efficient land under cultivation.

   iii) Rent is earned by all types of land including the marginal land.

   iv) According to Subsistence wage theory, workers get wages that are enough to enable them to exist.

   v) The Wages fund theory was propounded by Adam Smith.

   vi) In the classical theory of interest, saving is assumed to be interest elastic.

   vii) Investment varies inversely with rate of interest.

4) Fill in the blanks.

   i) ………and …………were the most prominent economists of the classical school.

   ii) Ricardo's theory of rent is based on ……………reasoning.

iii) The classical theory explains interest in terms of .... for and............. of savings.

iv) In the .... run, the actual wage rate can be at variance from the subsistence wage.

v) The Wages fund theory does not suggest that in the ……………. run, wage rate should remain stable at a certain level.

vi) The classical economists did not provide any coherent theory of…………….

vii) According to Adam Smith, employers earned profits due to .... used by them.

18.4 THE MARGINAL PRODUCTIVITY THEORY

Karl Marx and some other socialist thinkers were of the view that in a capitalist system, labour was not paid all that it produced. The surplus was retained by the capitalist and it constituted his profit. This was such an indictment of capitalism that the system looked unethical. Some economists did not agree with Marx and attempted to prove that in a capitalistic system of production there was no exploitation of workers. In doing so they developed the Marginal Productivity Theory of Distribution in the particular context of wage and labour. Later on, this theory was used to explain the determination of rewards to other factors of production also. Among the exponents of the Marginal Productivity Theory, J.B. Clark was the foremost. In The **Distribution of Wealth,** he attempted to identify the objective basis of distribution and in the process he developed the marginal productivity theory of distribution. Later on, Jevons, Wicksteed, Walras and Marshall also made their contributions by way of making certain refinements in this theory. It is, however, to be noted that whereas for J.B. Clark, the marginal productivity theory is essentially a theory of distribution, for Marshall it is a theory of demand for the factors of production.

18.4.1 Concepts of Productivity

It is necessary for you to learn certain concepts of productivity before the marginal productivity theory is explained to you. These concepts are as follows:

1) **Average physical productivity (APP):** The output in any productive activity is always in the form of physical units. For example, in agriculture the output of wheat may be measured in quintals, in a readymade garments factory, shirts and trousers are measured in units. You know that production is carried out jointly by land, labour, capital and enterprise. Let us suppose that it is possible for us to separate the contribution of all the units of a factor from joint output. In this case, average physical productivity of this factor i.e. labour will be found by dividing the total output due to labour by total number of units of labour. This may be written as follows:

$$\text{APP of labour} = \frac{\text{Total output due to labour}}{\text{Total no.of units of labour}}$$

You have learnt the concept of average physical productivity in previous unit. There it has been explained that the shape of APP curve is like inverted 'U'.

2) **Marginal physical productivity (MPP):** You have learnt the concept of marginal physical productivity in previous unit. Here it will suffice to say that keeping quantities of other factors of production as constant, if a variable factor, which is labour in this case, is increased by one unit, the addition to total production that takes place is its marginal physical productivity. We can express the marginal physical productivity of the nth unit of labour as follows:

$$MPP_n = TPP_n - TPP_{(n-1)}$$

In the equation, MPP_n is the marginal physical productivity of the nth unit of labour. TPP_n is the total productivity of n units and $TPP_{(n-1)}$ is the total productivity of (n-1) units. Earlier, it has been explained that the shape of MPP curve is like inverted 'U'. Further, it intersects APP curve at its highest point. This has been shown in Figure 18.1.
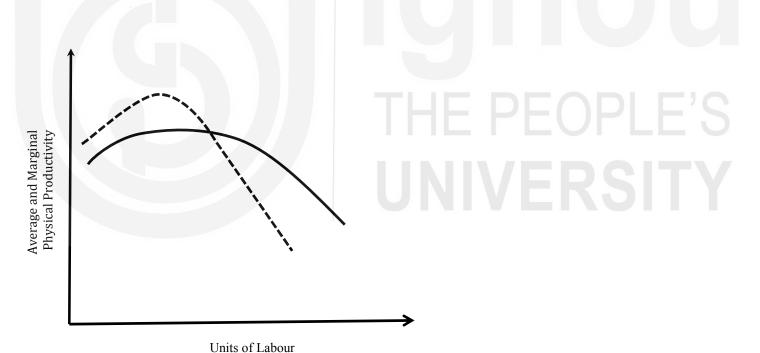
Figure 18.1 :Average and Marginal Physical Productivity

3   **Average revenue productivity (ARP):** Since factors of production are paid in the form of money, it is far more useful to know the money value of the productivity of a factor. Average revenue productivity of a factor refers to the money value of the average physical productivity. For knowing average revenue productivity of a factor, its average physical productivity has to be multiplied by the price of the product. We can express this as follows:

$$\text{ARP} = \text{APP} \times P$$

Where,

ARP= Average revenue productivity,

APP = Average physical productivity, and

P= Price of the product.

Average revenue productivity curve is an exact replica of average physical productivity curve.

4   **Marginal revenue productivity (MRP):** From the point of view of the determination of the price of a particular factor, the concept of marginal revenue productivity is far more useful than the concept of the marginal physical productivity. In order to find the marginal revenue productivity of a factor, say labour, one has to multiply the marginal physical productivity by the marginal revenue of the product. This may be expressed as follows:

$$\text{MRP}_n = \text{MPP}_n \times \text{MR}$$

Where,

MRP_n = Marginal revenue productivity of the nth unit of labour,

MPP = Marginal physical productivity of the nth unit of labour, and

MR = Marginal revenue of the product.

Under perfect competition since marginal revenue is always equal to the price, in order to find MRP one can multiply MPP by the price also. The marginal revenue productivity curve under perfect competition is exact replica of marginal physical productivity curve. Under monopoly it has the same shape, but is far steeper than MPP curve. This is so because under monopoly not only marginal revenue remains lower than price, but it also shows a tendency to decline as the sales of the product increase.
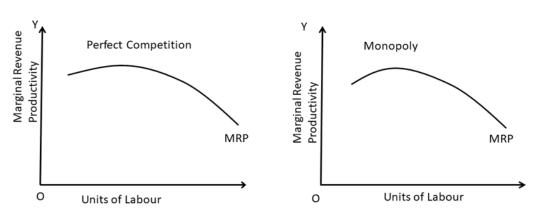

Figure 18.2: Marginal Revenue Productivity Curve under Perfect Competition and Monopoly

5   **Value of marginal physical product (VMPP):** Value of marginal physical product refers to the value one gets by multiplying the marginal

physical productivity by the price of the product. This may be expressed as follows:

$$VMPP = MPP \times P$$

Where,

VMPP= Value of marginal physical product,

MPP= Marginal physical productivity, and

P= Price of the product.

Under perfect competition since marginal revenue is equal to price, MRP and VMPP are equal. However, under monopoly because marginal revenue is lower than price, MRP is lower than VMPP.

18.4.2 Statement of the Marginal Productivity Theory

There are two versions of the marginal productivity theory. According to the J.B Clark's version of the theory, reward to a factor of production for its services is determined by the marginal revenue productivity of that factor. Alfred Marshall takes a somewhat different view. He states that the marginal revenue productivity of a factor reveals the demand for that factor. This demand together with the supply of the factor determine the factor price which in a perfectly competitive market is naturally equal to the marginal revenue productivity of the factor.

You have learnt earlier that buyers make a demand for commodities because they have utility. They do not mind paying for these commodities as they possess want satisfying power in the form of utility. Factors of production are not directly useful in the sense that they do not have want satisfying power. However, their importance lies in their usefulness in production. Hence, the demand for a factor of production depends on its productivity. It is thus clear that in contrast to the demand for consumer goods which is direct, demand for a factor of production is derived and depends on the demand for those goods in the production of which it will be used.

It is clear that productivity is relevant for determining the reward to a factor of production. Another aspect that has to be explained is as to why the producer attempts to equalize the factor price with the marginal revenue productivity only. Since now almost all economies are totally monetized implying that factors of production are remunerated in money only, the concepts of average physical productivity and marginal physical productivity are not directly relevant. Now, we are left with three concepts, viz., Average revenue productivity, Marginal revenue productivity and Value of marginal physical product. Out of these three measures of productivity, the producer attaches importance to marginal revenue productivity only.

The principal objective of all producers is to maximize their profits. In order to realize this objective, the producer must equalize the reward to a factor with the marginal revenue productivity. This condition is valid for all market conditions. However, in case of a perfectly competitive product market, the

value of marginal physical product will be the same as the marginal revenue productivity. Further in a perfectly competitive factor market, the reward to a factor will be equal to marginal revenue productivity as well as average revenue productivity. This has been shown in Figure 18.3.
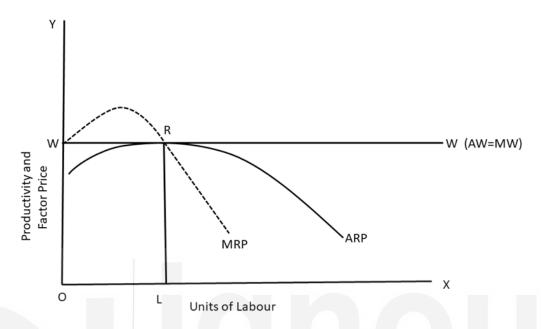

Figure 18.3: Factor Price, that is, wage rate equals MRP and also ARP

It can be seen in Figure 18.3 that if the factor in question is labour, then the wage rate OW, determined by the interaction of demand for and supply of labour equals both marginal revenue productivity and average revenue productivity. In case the producer does not follow the rule of equalizing marginal revenue productivity of a factor with its price, he cannot maximize his profits.

Broadly, marginal productivity theory is correct as a factor's reward normally cannot be greater or less than its marginal revenue productivity. However, the marginal productivity theory is based on a number of assumptions which need to be stated to understand the implications of the theory.

18.4.3 Assumptions of the Marginal Productivity Theory

The marginal productivity theory is based on the following assumptions:

1   Perfect competition is assumed to be prevalent in the factor markets. Suppose the factor of production that we are considering is labour. It is assumed that in the market for labour, the number of buyers and sellers is so much that the wage rate cannot be influenced by any one of them single handed. Moreover, labour is assumed to be both homogeneous and mobile.

2   The commodity produced by the concerned factor of production is assumed to be selling in a perfectly competitive market.

3   The theory assumes that the various factors of production can be combined in different proportions in the process of production. This means that it is possible to carry out production by varying the quantity

of one factor of production whereas the quantities of other factors of production remain constant.

4   The production takes place in accordance with the law of variable proportions, implying that in the final stage it is the law of diminishing returns which operates.

5   The theory assumes full employment in the economy which implies that all factor units are employed. Thus, it connotes that no factor units will be willing to work at any price/reward which is less than the prevailing market price.

18.4.4 Reward to a Factor and Factor Employment in a Firm

We have stated earlier in this Unit that a factor of production is useful to a producer on account of its productivity. Therefore, the firm carrying out production makes a demand for a factor of production keeping in view the marginal revenue productivity of that factor. Look at Figure 18.3, where the curve MRP represents the marginal revenue productivity of labour in a particular firm. The downward sloping portion of this curve essentially indicates the firm's demand for labour. From the firm's point of view, the supply of labour is perfectly elastic and it can employ labour in whatever quantity it likes at the prevailing wage rate which is OW. This wage rate as earlier pointed out is determined by the forces of demand and supply in the labour market. In a perfectly competitive labour market, neither the firm employing labour nor any worker offering his services can influence this wage rate by exercising any influence either on the demand for or supply of labour. In this situation, every firm employing labour is a wage-taker and faces the supply curve of labour as shown by WW in Figure 18.3. Since the supply curve of labour is perfectly elastic, not only the average wage and the marginal wage are equal but they are also constant throughout.

Since a firm carries out production in order to earn maximum possible profit, it expands its production upto a point where marginal revenue productivity of a factor becomes equal to the marginal factor price. In our illustration, labour is the variable factor. Hence, the firm decides to employ labour upto such a point that the marginal revenue productivity of labour becomes equal to marginal wage. In Figure 18.3, the firm reaches this stage when it employs labour in OL quantity. By employing less of labour than OL and carrying out production will mean loss of some profit that the firm could earn. Similarly, employing labour in quantity larger than OL will result in some unavoidable loss because beyond OL marginal revenue productivity is less than the marginal wage. Thus we generalize that the firm would be in equilibrium only if it employs the labour (variable factor) in such a quantity that its marginal revenue productivity becomes equal to marginal wage which in a perfectly competitive labour market is the same as average wage.

In Figure 18.3, you will observe that not only marginal revenue productivity of labour is equal to a marginal wage but the two are also equal to average revenue productivity and average wage. In this situation, the firm neither appropriates any surplus nor suffers any loss. Hence, neither new firms feel

induced to join the industry, nor any of the old firms feel any compulsion to leave it. The industry is thus in equilibrium.

18.5 CRITICAL ANALYSIS OF MARGINAL PRODUCTIVITY THEORY

The marginal productivity theory does not offer an entirely satisfactory explanation of distribution. It has been criticized on the following grounds:

1   **Factors of production are not always divisible:** Marginal productivity of a factor of production can be estimated only when a factor of production should be divisible or variable in small quantity. In practice, however, this is not always possible. How do we measure the marginal productivity of large steel plants which are neither variable in small quantity nor divisible.

    Therefore, measurement of marginal productivity of capital equipment in most cases is extremely difficult.

2   **Factor proportions in most modern industries are not variable:** In modern industries now sophisticated technology has been introduced, and as a result labour and capital are employed in some fixed ratios. Producers think that these factor proportions cannot be changed. This is a situation in which marginal productivity of a factor cannot be measured.

3   **Marginal productivity of capital and enterprise is not measurable:** In the production process, capital acquires the form of capital equipment and in capital equipment, technology on which productivity of labour greatly depends is embodied. This is such a complex situation in which the available methods of estimated marginal productivity of capital cannot be measured. Further interest is earned by the lender of the funds. Does it imply that money lending is a productive activity, and in case this is true, then how is money lending related to the productive activity of machinery, plant and other capital equipment is a riddle which the marginal productivity theory has failed to resolve. The problem with respect to enterprise is still more difficult to overcome because its units cannot be identified clearly. Further like land, labour, capital and enterprise is not a variable factor which completely rules out the measurement of the marginal productivity of enterprise.

4   **Unrealistic assumptions:** The assumption of perfect competition is highly unrealistic, because it is not met either in factor markets or commodity markets. In the real world, imperfect competition prevails and it is possible for the employer to hire factors of production for a remuneration which is lower than the marginal productivity. This is the basis of exploitation in a capitalist society operating at a level of less than full employment.

5   **The marginal productivity theory does not explain distribution:** The marginal productivity theory does not explain how rewards to different factors of production are determined. It merely explains the demand for a

factor of production and then acknowledges the fact that reward to a particular factor of production is determined by its demand and supply. Having known the factor price, the firm employs a factor upto a point where its reward is equal to its marginal revenue productivity. Hence, the marginal productivity theory cannot be accepted since it is based on highly questionable assumptions.

Check Your Progress C

1   Differentiate between Average physical productivity and Marginal physical productivity.

……………………………………………………………………………

……………………………………………………………………………

……………………………………………………………………………

……………………………………………………………………………

……………………………………………………………………………

2   What do you mean by Marginal revenue productivity.

……………………………………………………………………………

……………………………………………………………………………

……………………………………………………………………………

……………………………………………………………………………

……………………………………………………………………………

3   State whether the following statements are **True** or **False.**

i)   Reward to a factor is equal to its marginal revenue productivity………….

ii) Marginal productivity curve reflects the supply of the factor concerned…….

iii) The marginal productivity theory assumes perfect competition in factor market………….

iv) The marginal productivity theory assumes imperfect competition in the product market………….

v)   The marginal productivity theory assumes fixed factor proportions in production………….

4   Fill in the blanks.

i)   On dividing total output due to labour by the total number of units of labour one get saverage ....productivity of labour.

ii) For knowing average revenue productivity, average physical productivity is to be multiplied by the .... of the product.

iii) On multiplying the marginal physical productivity by the price of the product one gets ....

iv) The prevailing factor price is equilibrium factor price if it is equal to........... of the factor.

v) Under .... marginal revenue productivity of a factor is equal to value of its marginal physical product.

18.6 LET US SUM UP

The income distribution is examined in two ways. One way to examine it is to study as to how the national income has been shared by the people. This is called personal distribution. The other way to examine it is to study as to how different factors of production have been rewarded. This is called functional distribution.

The earliest systematic discussion on distribution of income is found in the writings of the classical economists. They, however, did not provide a general theory which could explain rewards to all factors. They developed specific theories for different factors of production. The theory of rent was developed by Ricardo who stated that it is paid to the landlord for the original and indestructible powers of the soil. There are two theories of wages, the subsistence theory of wages states that wages are fixed at the subsistence level of workers. The wages fund theory states that wages are determined by the amount of wages fund and the supply of labour. Interest, according to the classical economists, is determined by the demand for and supply of capital. Profit is also earned by the capitalists. These theories now do not find any supporters.

The marginal productivity theory developed by J.B. Clark and others suggests that reward to each of the four factors of production is determined by its marginal revenue productivity. When remuneration to a factor is equal to both marginal and average revenue productivity and also marginal factor price then both the firm which employs the factor of production and the industry to which the firm belongs are considered to be in equilibrium.

The marginal productivity theory is based on highly questionable assumptions which undermine its validity. Further, marginal productivity theory explains the demand for a factor rather than its price. The reward to a factor is determined by the demand for and the supply of the factor of production in question.

18.7 KEY WORDS

Average Physical Productivity: Per unit productivity of a factor of production measured in physical units of the product.

Average Revenue Productivity: Per unit productivity of a factor of production measured in money value of the product.

Factor Price: Reward to a unit of a factor of production expressed in money terms.

Functional Distribution: Distribution of income among the various factors in accordance with the services rendered by them.

Interest Elasticity: Responsiveness to changes in interest rate.

Marginal Land: Inferior most land whose value of output can just recover the cost of cultivation.

Marginal Physical Productivity: Addition to total output due to an additional unit of a variable factor.

Marginal Revenue Productivity: Value obtained by multiplying marginal physical productivity by the marginal revenue.

Personal Distribution: Distribution of the national income among the people.

Rent: Reward to landlord for the services of land.

Subsistence Wage: Wage rate which is sufficient only for subsistence living.

Value of Marginal Physical Product: Value obtained by multiplying marginal physical productivity by the price.

Variable Factor Proportions: Proportions in which various factors of production are employed having scope for changes.

18.8   ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

2   (i) False (ii) True (iii) True (iv) False (v) False (vi) True (vii) True

3   (i) Land (ii) Interest (iii) Entrepreneur (iv) Wages

(v) Personal distribution   (vi) Functional distribution

Check your progress B

3   (i) False (ii) True (iii) False (iv) True (v) False (vi) True (vii) True

4   (i) Adam Smith, Ricardo (ii) Deductive (iii) Demand, Supply (iv) Short (v) Long (vi) Profit (vii) Capital.

Check your progress C

3   (i) True (ii) False (iii) True (iv) False (v) False

4   (i) Physical (ii) Price (iii) Value of marginal physical product

(iv) Marginal revenue productivity (v) Perfect competition.

18.9   TERMINAL QUESTIONS

1   Define functional distribution and distinguish it from personal distribution.

2   How did classical economists explain distribution of income among various factors of production?

3   Distinguish between interest and profit. Is it not correct to say that both are earned by the capitalists for the capital they invest in the production process?

4   How did classical economists explain determination of wages?

5   Explain the marginal productivity theory of distribution. Also state its assumptions. Why is the marginal productivity theory not considered a satisfactory theory of distribution?

Note: **These questions will help you to understand the unit better. Try to write answers for them. But do not send answers to the University. These are for your practice only.**

UNIT 19   DISTRIBUTION OF INCOME-I : WAGES AND INTEREST

19.0   OBJECTIVES

After studying this unit you should be able to:

- distinguish between competitive and non-competitive wages

- explain the significance of collective bargaining for the workers

- describe the functions of interest

- state the difference between nominal and real rates of interest

- discuss the various approaches of determination of rate of interest.

19.1   INTRODUCTION

In our day-to-day life, we quite often use the words wages and interest. In economics, these words have a definite meaning. In this unit you will learn in detail about wages. You will also learn the significance of collective bargaining in the determination of wages. Collective bargaining has least importance in case of competitive labour market. In such cases the wage rate is equal to the marginal productivity of labour. You will be also acquainted with the influence of interest rates on the allocation of funds and relevance of real interest rates in the decision-making process.

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19.2 WAGES

The term 'wages' refers to the amount of remuneration paid to workers in return for the labour which they contribute in production. Payment of wages to workers may be either in the form of money or in kind. Sometimes workers are self-employed and carry out production according to their own plans. In all such cases their wages are not easily distinguishable from their profits.

Money wage and Real wage

Economists often talk of money wage and real wage. The concept of money wage is simple. It refers to the amount of money paid to the worker by the employer for the services rendered by him in production. The concept of real wage is wider. It refers to the amount of goods and services which a worker can obtain for his money wage plus the incidental benefits which he enjoys from the job. No doubt workers care a lot for their money wages but from the point of view of their living standard, their real wages are far more relevant.

Determination of wages

Wages in traditional societies were customarily determined and were just sufficient for subsistence living. In modern market economies, wages are determined by interaction of demand for, and supply of labour. You might have observed that now-a-days wage rates differ widely. A mechanical engineer may earn Rs. 1,60,000 per month whereas a clerk earns Rs. 60,000 and an unskilled worker gets Rs. 20,000. These wage differentials are important and any theory of wages must explain them. You must be knowing that wages are higher in the USA than for the same type of labour in Italy, and they are higher in Italy than in India. This implies that the general wage level is higher in some countries than in others. This is because in certain countries natural resources and capital are available in abundant quantity and the technology is superior. These factors favorably affect the productivity of labour which obviously has a bearing on the wages of workers. The productivity of labour is lower in all those countries which are not richly endowed with natural resources and capital and are also poor in technical know-how. As a result, the general wage level is lower in these countries. But the labour is not homogeneous in any country, and, therefore, there exist separate markets for different types of labour in which different wages are determined.

Labour markets are broadly of two types: (1) competitive, and (2) non-competitive. In the absence of a trade union, the labour market may be competitive provided services of workers are demanded by a large number of small firms. The presence of trade unions who bargain for wages on behalf of workers and a very small number of employers who often collude against them make labour market non-competitive. Wages are never the same in competitive and non-competitive labour markets.

19.2.1 Competitive Wages

Competitive wages refer to return to labour in a competitive labour market for its services. Such a market for labour normally does not exist. Theoretically, the concept of competitive labour market assumes that labour is homogeneous and is provided by a large number of workers competing among themselves for getting employment. Similarly, the employers asking for the services of workers are so many that no one individually can affect the wage rate by his behaviour. In a competitive labour market whereas the workers attempt to secure as much wages as possible for them, the employers try to pay as low wages as possible for them. The wage rate that will actually be determined will depend on the demand for, and supply of labour.

The demand for labour is derived demand and depends on its usefulness in production which in concrete form gets reflected in its marginal revenue productivity. As you have already learnt in Unit 17 that eventually it is the law of diminishing returns that operates in production, the marginal revenue product of a factor of production declines as more of its units are employed. This implies that after a certain point, the marginal revenue product curve for labour will have a downward slope from left to right, and this segment of the marginal revenue product curve will actively be the demand curve for labour. Therefore, the demand curve for labour will have a negative slope. Look at Figure 19.1 where DD is the demand curve for labour.
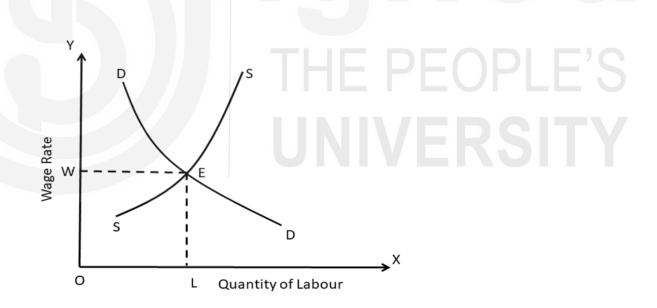
Figure 19.1 : Competitive Wage Rate

The supply of labour will be more at higher wages and less at lower wages. There are two reasons for this.

First, at lower wages only some workers will be willing to offer their labour. As wages rise more and more fresh workers will be willing to provide their labour.

Second, at higher wages some of the workers who were willing to work at lower wages might agree to work for longer hours. Therefore, in response to increase in wages supply of labour shows a tendency to increase.

But this should not be taken as an unqualified statement, because it has been observed that after reaching a certain level of wage rate, workers prefer leisure to more income and, therefore, the supply curve of labour has a backward slope. But for our present discussion we shall consider the supply curve of labour as shown in Figure 19.1. You will observe that no segment of the supply curve of labour SS has a backward slope.

In Figure 19.1, the demand for labour equals its supply at the wage rate OW. Workers, if competition is perfect in labour market, cannot compel employers to pay wages higher than OW and employers cannot force workers to accept wages lower than this. This is a competitive wage rate and is equal to the marginal revenue productivity of the labour. The competitive wage rate need not fall to minimum subsistence level if the country is well endowed with natural resources, capital and technical know-how. In a backward country, deficient in these resources competitive wage rate will be lower due to lower marginal productivity of labour and one should not be surprised if it actually falls to minimum subsistence level.

Let us now turn from the problem of wage rate in general and investigate the causes of differentials in competitive wage.

Some wage differentials are simply to compensate for the non-monetary differences in wages among jobs. Some jobs involve nerve strain, tiresome responsibility, seasonal lay-off, irregular job, short working life, dull training and lower social prestige. Naturally for these jobs wages may be somewhat higher so as to make them as attractive as other jobs. These are called 'equalizing differences'. Some other wage differentials are due to differences in the quality of labour. The work of a civil engineer is not the same as that of a mason or an unskilled labourer. Therefore, markets for their services are separate and non-competing and the wages determined for their work will be different.

Perhaps you are aware of this fact that in reality there does not exist a single market for labour as a group. There are as many markets for labour as there are the kinds of labour. In each of these labour markets competition may be perfect but on account of the non-competing nature of these groups, wage rate determined in one will be different from those in others.

19.2.2 Non-Competitive Wages

Real world labour markets are generally non-competitive. It is not always easy to grade labour into neat market categories. Only in cases when some labour is very specific, there may be a completely separate market for it. Otherwise in most cases, markets for various types of labour overlap and this introduces an element of imperfection in it.

Markets for particular types of labour may also be imperfect due to ignorance and immobility of labour.

But the more important reasons for imperfections in labour markets are collective bargaining by the trade unions on behalf of workers, wage policies of particular firms and the small number of employers. Now trade unions

exist in almost all countries and they bargain on behalf of workers with the employers for both service conditions and wage rate. Their intervention in the labour market eliminates the element of competition from it and thus influences the process of wage determination in a crucial manner. You will learn more about collective bargaining and its bearing on the wage determination in the next section of this unit.

Wages are sometimes sticky. They do not fall even when the demand for labour diminishes due to a decline in economic activity. This happens either due to the wage policy of the firm which employs labour or due to the resistance from the workers.

Lastly, with the growth in the size of industrial units, the number of employers for each kind of labour has become very much restricted and this has undermined the element of competition. So whatever be the reasons for imperfections in the labour market, the wage rate determined in it is generally at variance with the marginal productivity of labour.

Check Your Progress A

1   Distinguish between competitive and non-competitive labour market.

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2   What is the main distinction between competitive wage and non-competitive wages.

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3   State whether the following statements are **True** or **False**

    i)   Wages are always paid to workers in the form of money.

    ii)   From the point of view of the workers' living standards. real wage relevant than money wages.

    iii) Wages in a competitive labour market are just sufficient for subsistence living.

    iv)   Trade union is an organization of traders.

    v)   Workers' marginal productivity has a bearing on their wage rate.

    vi)   Demand curve for the labour has a positive slope.

vii) That segment of the marginal revenue product curve of labour which slopes downwards from left to right indicates the demand for labour.

viii) Wage rate is determined by the demand for, and supply of labour.

4 Fill in the blanks.

i) Real world labour markets are generally ……………...

ii) If all labour were homogeneous, competitive wage differentials could be explained as …………..differences.

iii) Supply curve of labour has a …………..slope.

iv) When workers value leisure more than increased income, the supply curve of labour has a ………… slope.

v) Wages in India are lower than in the USA because the productivity of labour is………. in the former.

vi) Presence of a trade union undermines …………… in labour market.

vii) If there is just one employer, the labour market will be ………

viii) Workers belonging to non-competitive groups get …………..wages.

19.3 COLLECTIVE BARGAINING AND WAGES

The bargaining power of workers is weaker as compared to employers for various reasons. Employers can pay wages to workers which are less than their marginal revenue productivity. This actually amounts to exploitation of workers. Workers are now conscious of their exploitation by the employers and want to prevent it. In order to achieve this objective, they organize themselves into trade unions which do collective bargaining with the employers on their behalf.

19.3.1 Trade Unions and Collective Bargaining

Trade Unions are organizations of workers. Their membership is always voluntary,Workers join a trade union with the expectation that when it bargains with the employers on such behalf, it gets higher wages for their services. Trade unions often enjoy statutory recognition and thus have a legitimate right to negotiate with the employers or even fight with them in order to protect the interests of the workers.

Maurice Dobb has very rightly remarked, "Trade unions are essentially the product of a capitalist wage system in that they represent the obvious line of defence against the economic weakness, in which propertyless wage-earners find themselves when acting as unorganised individuals".

It is obvious that in the absence of any organization each individual worker will have to bargain separately for his wages, and the employer taking full advantage of this weakness will deny him his legitimate wages. He can, however, overcome this weakness by joining some trade union. Collective bargaining through a trade union definitely improves the bargaining power of the workers and thus they manage to get wages which are certainly higher than those which they might have got if there were no trade unions.

Some economists have, however, failed to appreciate the role of trade unions in securing fair wages for the workers. Assuming that competition in the labour market is perfect, they contend that the wage rate is bound to be equal to the marginal revenue productivity of labour and no trade union whatever be its strength can compel employers to pay wages more than this. Therefore, in their opinion, trade unions have no relevance even for the workers.

But these economists are not right in their assertion because the very assumption on which they base their argument is unrealistic. In reality most labour markets are imperfect. In many cases the employer may be just one firm, and if there are more than one employers, they may collude to force workers to accept wages which are less than their marginal revenue productivity.

Therefore, trade unions have great relevance for the workers and they will continue to exist till the employer-employee relationship that has given rise to them exists.

19.3.2 Collective Bargaining and Wage Increases

Recognizing the fact that when workers bargain collectively through a trade union, they manage to secure higher wages. Let us examine how in practice they can hope to realize this objective. Samuelson has mentioned three methods of raising wages; all are interrelated:

i)   trade unions can restrict the supply of labour;

ii) they can force the employer to raise the standard wages, and

iii) they can create conditions whereby the demand curve for labour shifts upward.

1   **Restricting the supply of labour:** Workers' unions often restrict the supply of labour in order to secure higher wages for the members. The common restrictive devices are reduction in working hours, immigration barriers, long periods of apprenticeship, preventing non-union members from holding jobs and slow down of the working pace. Look at Figure 19.2 where the impact of these measures to restrict labour supply on the wage rate has been shown. In this figure the original supply curve of labour is SS and the wage rate determined is OW. A contraction in the supply of labour due to restrictive measures of the trade union shifts the supply curve leftward. The supply curve is now S_1, S_1, and the wage rate determined is OW_1, which is higher than OW.
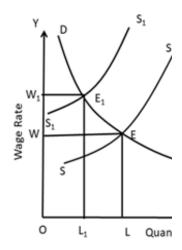
Figure 19.2 : Restricting the supply of labour in order to secure a rise in wages

2   **Raising the standard wage rates:** Sometimes trade unions insist on raising the standard wage rate, but do not object to retrenchment of some workers. In all such cases the employment declines. Look at Figure 19.3 where OW is the original wage rate.
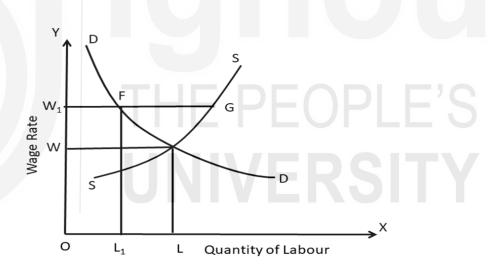
Figure 19.3: Raising the wage rate results in decline in employment

Under pressure if employer raises the wage rate from OW to OW_1 the employment falls from OL to OL_1,

3   **Shifting the demand curve for labour upward:** If workers' unions secure higher wages, the living standards of workers improve. Often this in turn raises their productivity and the demand curve for labour eventually shifts upward stabilizing the wage rate at a higher level.

Figure 19.4 where the demand curve for labour shifts upwards from DD to D_1D_1, and as a result wage rate rises from OW to OW_1,. The role of trade union in this case is that while bargaining for a higher wage, it assures the employer that the productivity of workers will rise and be commensurate with the wage rate.
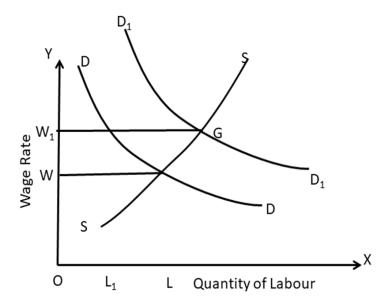
Figure 19.4: Upward shift in the demand curve for Labour cause an increase in the wage rate

19.3.3 Collective Bargaining and Elimination of Exploitation

Monopsony is a situation in which there is just one employer. In such a case average wage (AW) curve rises from left to right because more workers can be employed only at higher wages. The corresponding marginal wage curve (MW) also rises and its upward slope is twice the upward slope of AW. Look at Figure 19.5 where employment has been determined with reference to the point of intersection of the marginal revenue productivity (MRP) curve and the marginal wage curve. Here, employment is OL and the wage rate that is determined is OW. The difference between MRP and AW is the exploitation of labour. The trade union through bargaining can succeed in getting an increase in wage rate until it becomes equal to the MRP of labour. The wage rate can be pushed upto OW_1, where it equals MRP of labour

Figure 19.5: Increase in Wage rate under monopsony

When this actually happens the exploitation of workers is fully eliminated. A rise in the wage rate less than WW_1, will eliminate exploitation of workers only partially.

Check Your Progress B

1. What is collective bargaining in labour market.

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2. List three methods of raising wages.

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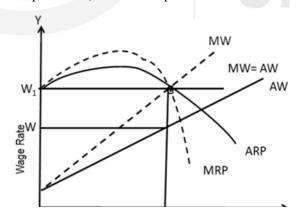3. State whether the following statements are **True** or **False.**

   i) The bargaining power of workers is weaker than that of employers.

   ii) Workers are never exploited by employers.

   iii) Workers collectively bargain through trade unions.

   iv) Trade unions are essentially the product of communist social system. ....

   v) By restricting the supply of labour a rise in wage rate can be secured.

   vi) Monopsony is a situation in which there are a few employers of labour.

4. Fill in the blanks.

   i) A trade union is a ………………organization of workers.

   ii) If wage rate is ....than the marginal revenue productivity, the trade union shave relevance.

   iii) Under .... in the absence of a trade union, exploitation of workers is inevitable.

   iv) Wage rate will rise if demand curve for labour shifts …………….

   v) Wage rate will rise if the supply curve of labour moves…………….

   vi) Forcing employers to raise the standard wage can result in ....

19.4 INTEREST

Interest is a payment for the use of money. If you borrow money from your bank to buy a machine, a shop or a tractor, you will have to pay interest on this money. The lender asks for interest because he is denied the use of his own money until the borrower repays the loan. Let us explain the useful

functions of interest, variations among interest rates and nominal or real interest rate.

19.4.1 Functions of Interest

Interest performs a very useful function in a market economy. In such an economy, producers generally borrow funds for making investments. Unless the economy is passing through the phase of severe depression, the demand for funds for investment purposes will be greater than the supply of funds. The question thus arises is as to who should get the funds and which projects should be allowed to be undertaken with the help of borrowed financial resources. In a market economy, no authority will decide these matters using its own discretion or criterion. The prevailing interest rate will settle these issues. You are perhaps aware that all projects are never equally profitable. Therefore, if the prevailing interest rate is quite high, then only those investors who have very good projects in hand from profitability point of view will borrow funds and will go ahead with their investment plans. At a relatively lower rate of interest, even somewhat less remunerative projects can obtain funds.

It should thus be clear to you that interest rates have a useful role to play in allocation of scarce funds, the merit of this method of funds allocation is that it is always the most remunerative project that gets funds first. Discretion and subjectivity have no place in funds allocation by means of interest rates.

19.4.2 Variations among Interest Rates

So far we have talked of the interest rate, but in real life you will find that at a given point of time there are many rates of interest.

Today, you may get an interest rate of 5.0 per cent on deposits in savings account and 6.5 per cent on fixed deposits for three years made with banks. On fixed deposits made for shorter periods, interest rates are lower. Banks generally charge an interest rate of 16.5 per cent approx. on advances but for a car loan from some of the Banks, you may be required to pay 18.0 per cent. Rates of interest for consumption and production purposes are not the same. Similarly, the rate of interest which a small firm will be required to pay will not be the same which a large firm pays. Rate of interest on bonds issued by the government is generally lower than that on the debentures issued by the private companies. Even the government's different securities do not yield the same rate of interest. For example, the rate of interest of Treasury Bills is always lower than that on the bonds.

Gross interest and Net interest

The quoted rates of interest are actually the gross rates of interest and are more than a 'rental fee' for the use of money. Strictly speaking 'rental fee' for the use of money is net rate of interest and is the same for all borrowings. But gross rates of interest include payments for many other purposes apart from net rate of interest. Some loans involve greater risks than others.

For example, the risk element is greater in case of a loan to a small firm with small assets than in case of a loan to the Tata Iron and Steel Co.

Similarly, loans for consumption purposes are riskier than loans for production purposes. In case of lending for short period the risk element in respect of capital value is far less than in cases of long term loans. Obviously the lender wants to be adequately compensated for the risk involved in lending. It is this reason why interest rates are higher on loans given to small borrowers. Similarly, loans given for consumption purposes and for long periods involve higher rates of interest.

Processing of loan and its management involve some costs. These are not the same in respect of all loans. Further getting repayment of loan and periodical payments of interest is not always automatic. Often borrowers have to be sent reminders and when these do not prove to be effective, other methods, including recourse to legal remedy become necessary. This whole exercise involves both costs and inconveniences. Therefore, keeping in view the default probability and the resulting inconvenience and costs from it, the lenders charge the rate of interest. Since the probability of default is not the same in all money lending, the compensation expected for the same also differs and thus the quoted rates of interest vary from each other.

19.4.3 Nominal and Real Rates of Interest

Nominal rate of interest is that percentage return per year which has to be paid on any loan of money. In other words, it is quoted rate of interest and is not influenced by the purchasing power of money. You know that presently you can get 3 per cent per annum approx. as return on your deposits with your bank in the savings account. Similarly, one gets a return of 4.40 per cent per annum approx. on fixed deposits for a period of three years with banks, and a return of 6- 6.5 per cent per annum approx.on fixed deposits for the same period with corporate enterprises. These are all nominal rates of interest. They are important from the point of view of both lenders and borrowers as they influence their decisions to an extent as savers and investors.

However, in an inflationary economy when the general price level rises rapidly the nominal rates of interest lose much relevance. In an inflationary situation only the real rate of interest is relevant. The real rate of interest is arrived at after making adjustment in the nominal rate of interest for the rate of inflation.

Let us suppose, a certain nominal rate of interest is 10 per cent per annum in some country. In this country, in the relevant period the rate of inflation is 8 per cent per annum. The implication of this is that in one year the lender suffers in real terms a capital loss of 8 per cent on the money lent by him. Therefore, though the nominal rate of interest in this case is 10 per cent per annum, in real terms the lender earns about 2 per cent per annum only.

Sometimes, the rate of inflation is higher than the nominal rate of interest. In such a case the real rate of interest becomes negative. If such a situation develops in an economy, then many people do not consider it worthwhile to save and it may have its serious repercussions on the capital stock of the country.

Check Your Progress C

1 List the important functions of interest.

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2 Distinguish between nominal and real rates of interest.

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3 State whether the following statements are **True** or **False.**

i) Interest is a payment for the use of money.

ii) Allocation of scarce funds by means of interest rates is discretionary.

iii) Net rate of interest is the 'rental fee for the use of money.

iv) Risk element differs in different lending's, and this may cause interest rates differentials.

v) "Real rate of interest' is that percentage return which has to be paid on any loan of money.

vi) If rate of inflation is higher than the nominal rate of interest, the real rate of interest will be negative.

19.5 INTEREST AS THE RETURN ON CAPITAL

By now we know that interest is paid for the use of money. Since money is borrowed mostly for investment purposes, one can justifiably say that it represents capital and the interest paid for its use is the return on capital. The question now to be answered is as to how the rate of interest, that is, the rate of return on capital is determined. It is not easy to give an entirely satisfactory answer to this question.

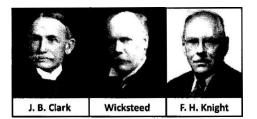**Theories of Interest**

The theories of interest can be divided into two groups: (1) Real theories, and (2) Monetary theories.

Real theories looked upon interest as the income obtained from capital. These theories attributed interest to real factors like productivity of capital, abstinence, time-preference, etc. Among the real theories, the more important theories are briefly summarised below:

1. ***Marginal Productivity Theory***.
   The theory, as postulated by J.B.
   Clark, Wicksteed and F.H.
   Knight, stated that the rate of
   interest is determined by the
   marginal productivity of capital.

   J. B. Clark Wicksteed F. H. Knight

   The theory put more emphasis on
   the demand for capital and
   ignored the supply aspect.

2. ***Psychological Theories.*** These theories attempted to link the rate of
   interest to the psychological factors that determine the supply of capital.

   J.S. Mill, **Senior** and others believed that the
   supply of capital depended on 'abstinence' and
   that the rate of interest was equal to the amount
   needed to induce the necessary abstinence on
   the part of the savers.

   J. S. Mill Bohm Bawerk

   BohmBawerk and others had the view that
   people prefer the present to the future and that
   the rate of interest measured such 'time
   preference'.

   The psychological theories overemphasised the forces
   underlying the supply of capital and ignored the role of
   demand in determination of interest rates.

3. ***Demand-supply Theory***. Irving Fisher and Marshall
   combined the marginal productivity theory and the
   psychological theories in an equilibrium theory.
   According to this theory, rate of interest is determined by
   the demand for and supply of capital. The demand for
   capital is determined by its marginal productivity, while
   supply of capital is determined by the abstinence or
   'waiting' of the marginal saver.

   Irving Fisher

Monetary Theories. Monetary theories emphasise the role of "money" in
determination of rate of interest. The important theories from this group are:

- Liquidity Preference Theory,
- Loanable Funds Theory, and
- IS-LM Theory

There is no agreement among economists as to how the rate of interest is
determined. Each of the above theories has its advocates. We look more
closely at these theories.

Liquidity Preference Theory

J.M. Keynes propounded the liquidity preference theory of interest. Keynes regarded interest as a purely monetary phenomenon. Interest is determined by the interaction of the demand for and the supply of money.

Keynes defined interest as the reward for parting with liquidity for a specified period. It is not a reward for hoardings but for postponing consumption. The demand for liquidity together with the supply of money determines rate of interest.

Demand for Money. Keynes believed that the demand for money is not a derived demand but a direct demand. Money is demanded because it is the most liquid of all assets which could be converted into goods and services without any loss of time and value. People want to hold money for the following motives:

- *Transactions Motive*. This demand reflects the need for cash for the current transactions of personal and business exchanges and is derived directly from the medium of exchange function of money. The transactions demand for money is the amount of it required over a period to carry out all transactions involving purchases and sales of commodities and in dealing in securities, property rights, and other claims of various types.

  The size of monetary balances required for transaction purposes depends upon the size of receipts and expenditures, the time pattern of expenditures, the intervals between receipts, and the price level.

- *Precautionary Motive*. Precautionary demand for money arises out of the need for any contingent payments or expenditures. Individuals and firms alike desire to hold cash balances for covering events of a more uncertain nature like accident, prolonged illness, loss of job or replacement of machinery, etc. These are called precautionary balances. Precautionary demand for money also depends upon the levels of income. At higher levels of income, individuals and firms may hold more cash balance for meeting unforeseen situations.

- *Speculative Demand for Money*. Money also serves as a store of value. The asset 'demand for money' arises on account of the store of value function of money. The speculative demand for money is to hold it as an alternative to the financial assets like bonds.

Of the motives discussed above, Keynes attached more importance to the speculative motive. While the transactional motive and the precautionary motive are the functions of the level of income, the speculative demand for money depends upon the rate of interest. In other words, the asset demand for money is influenced more by the speculative motive rather than by transactional and precautionary motives.

There exists inverse relationship between the assets demand for money and the rate of interest. Larger amounts of money would be held at lower interest

rate and vice versa. Prof. Keynes called the assets demand for money as 'liquidity preference'.

In brief, there are three motives for holding money in the form of cash. They are: transactions motive, precautionary motive and speculative motive.

Liquidity Preference and Determination of Interest. Ready purchasing power is called liquidity. Individuals and firms prefer to hold money in liquid form because it provides them a chance to make immediate use of the purchasing power. In other words, people's preference to keep their assets in the form of ready purchasing power is called liquidity preference.

The demand for money for liquidity preference is a direct function of the rate of interest. Liquidity preference curve has a downward slope to the right indicating that at higher interest rate, less money is demanded, and conversely, at low rate of interest more money is demanded.

Supply of Money. The aggregate supply of money (Ms) in an economy consists of (i) currency with the public (C), (ii) net demand and time liabilities of banks (DD + TD), and (Hi) other deposits with the Central Bank (OD). The supply of money in an economy is regulated by the monetary authority of that country, usually the Central Bank.

Equilibrium Rate of Interest. Equilibrium in the money market is determined at a point where demand for money equals its supply. Symbolically,

$M^d = M^s$

where, M^d = Demand for money, and

M^s = Supply of money.

The demand curve of money or liquidity preference curve slopes downwards to the right indicating that larger quantity of money is demanded at a lower rate of interest than at a higher rate of interest. The supply of money remains unchanged during the short-run, therefore, the supply curve of money has a vertical slope. Equilibrium in the money market is determined at a point, where the demand curve of money intersects the supply curve as shown in Fig. 18.6.
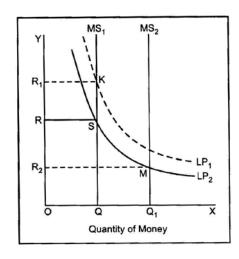

Fig. 19.6: Supply of Money and Liquidity Preference curve

In Fig. 19.6, LP$_1$, is the original liquidity preference curve which represents the demand for money. MS$_1$ is the supply curve of money which is perfectly inelastic. At a point of time money supply remains constant. Equilibrium rate of interest is determined at the point S where the LP$_1$, curve intersects the MS$_1$ curve. The equilibrium rate of interest is OR.

If the money supply remains unchanged but the liquidity preference increases, the LP curve shifts to LP$_1$, and the new equilibrium rate of interest is determined at point K, where rate of in3terest increases from OR to OR$_1$. It shows that money supply remaining unchanged the rate of interest increases with increase in liquidity preference and vice versa.

On the other hand, if the liquidity preference remains unchanged and money supply increases, as shown by the movement on MS$_1$ curve to MS$_2$, the equilibrium rate of interest shall fall to OR$_2$.
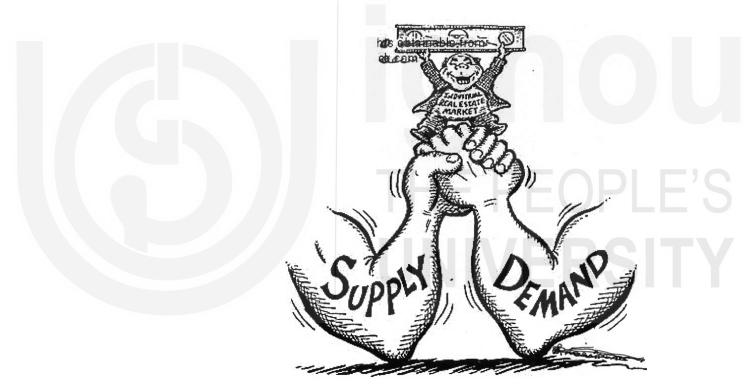
Out of the two determinants of interest, *i.e.*, the quantity of money and liquidity preference, Keynes attaches greater importance to the latter. It is so, because even if money supply remains unchanged, the rate of interest will increase and decrease according to the changes in the liquidity preference.

Criticism. Keynes' Liquidity Preference Theory of Interest has been criticised on the following grounds:

- *No Liquidity without Saving*. According to Keynes, interest is a reward for parting with liquidity. It is no compensation or inducement for saving. However, according to Jacob Viner, "*without saving there can be no liquidity to surrender.*"

- *Keynes Ignored the 'Real Factors'*. Rate of interest is not purely a monetary phenomenon as asserted by Keynes. Real forces like productivity of capital, saving, etc., also play an important role in the determination of interest rates.

- *Keynes' Theory is Indeterminate*. According to this theory, rate of interest is determined by the speculative demand for money and the supply of money available for satisfying speculative demand. Given the total supply of money, we cannot know how much money will be available to satisfy the demand for money.

- *Theory Fails to Operate in the Long-Run*. Keynes' Theory explains the determinants of the rate of interest only in the short-run. The theory fails to explain variations in the rate of interest in the long-run.

- *Marginal Efficiency of Capital Ignored*. According to Keynes, the demand for money is influenced by the liquidity preference. But the demand for money is also influenced by the marginal efficiency of capital.

Recent Refinements. The Keynesian theory of the demand for money has been refined and broadened and numerous empirical studies conducted to establish the degree of responsiveness of the demand for money with respect to income, the rate of interest and other variables.

To a number of economists, it is an over-simplification to consider the demand for transactions balances as a function of income alone. They argue that the demand for money for transaction purposes is positively related to income and inversely related to the rate of interest. Further, the classification of the demand for money into "transactions demand" and "speculative demand", however, has been considered by a number of investigators as somewhat artificial; they, instead, attempt to explain the total demand for money. But using different definitions of the money stock, empirical studies along this approach yield divergent results. Studies based on the conventional definition of the money stock suggest that the demand for money is responsive to both income and the rate of interest. **Prof. Milton Friedman**, on the other hand, uses a different definition of the stock of money; defining the money stock including time deposits in commercial banks, his study suggests a high income elasticity and practically no interest elasticity of the demand for money. This led to his conclusion that money is a "luxury" good, the demand for which increases in greater proportion than the increase in income.

Apart from income and rate of interest, wealth and other variables have been introduced into the demand-for-money function. But while it is generally agreed that national wealth bears some relation to the demand for money, it is statistically difficult to assert the independent effects of wealth and income on the demand for money as income and wealth are highly correlated. It has also been argued that the liquidity function is irreversible in that its downward trail after an increase in the supply of money may be different from its upward path after a corresponding decrease in the money supply; this reflects changes in the composition of assets and assets value as the rate of interest changes.

Loanable Funds Theory

The loanable funds theory was originally propounded by **Knut Wicksell**, and was later developed by economists like **Bertil Ohlin, Gunnar Myrdal** and **Robertson**. According to the theory, the rate of interest is determined by the equilibrium between the demand for and supply of loanable funds. Funds which are available in the market for lending and borrowing are called loanable **funds**.

Gurnar Myrdal

Demand for Loanable Funds. Demand for loanable funds comes primarily from three sources which are as follows:

i) *Investment*. The largest borrowers of money are the business firms or the producers. The producers borrow money for the purchase or manufacture of new capital goods, including building up of the inventory stocks. At low rate of interest, there is more demand for money for investment purposes and vice versa.

ii) *Hoarding*. People hold cash balances for transactions, precautionary and speculative motives. Hoardings are interest elastic. At high rate of interest less idle cash will be demanded, and vice versa.

iii) *Dissaving*. People spend on consumption in a given period some of the savings accumulated in the past. Their current consumption exceeds the income of the previous period. Sometimes, the households have to borrow for the purchase of consumer durables such as car, refrigerator, house, etc.

At high rate of interest less money is demanded, and at lower rate of interest more money is demanded.

Supply of Loanable Funds. The supply of loanable funds is derived from a number of sources, *viz.*, savings, dishoarding, bank credit, supply of legal tender money, disinvestment, *etc*.

i) *Savings*. The prime source of the supply of loanable funds is the saving of the households and firms. When a households's consumption expenditure falls short of his income, savings take place. Firms also save in the form of undistributed profits. At higher rate of interest the propensity to save is more than at a lower rate of interest.

ii) *Bank Credit*. Banks create credit through loans. They increase the stock of money by extending loans to business or making investment in securities and bonds.

iii) *Legal Tender Money*. The central bank of a country enjoys the sole right to issue legal tender money which includes paper notes, coins and now plastic currency.

iv) *Disinvestment*. Disinvestment means disentangling of the present fixed and working capital. When the funds reserved for the maintenance, wear

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and tear and replacement of plant and equipment are used for lending purposes, it is called disinvestment.

v) *Dishoarding*. Households and business firms maintain cash reserves with themselves for transactional, precautionary and speculative motives. A part of these cash reserves may be used for lending purposes. The release of accumulated cash reserves for lending is called **dishoarding**.
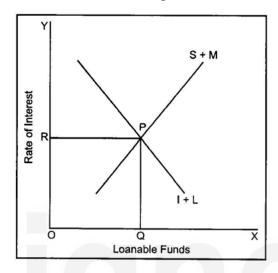

Fig. 19.7: Equilibrium Rate of Interest

Equilibrium Rate of Interest. Rate of interest is determined at a point where the demand for loanable funds equals their supply. The demand curve of loanable funds slopes downwards indicating that more money is demanded at a lower rate of interest than at a higher rate of interest. Supply curve of the loanable funds, on the other hand, slopes upwards showing that more money is supplied at a higher rate of interest than at a lower rate of interest. In Fig. 19.7, S + M is the supply curve of loanable funds, whereas I + L is the demand curve for loanable funds. Equilibrium rate of interest is determined at point P where at OR rate of interest OQ quantity of money is demanded and supplied. In case, the rate of interest is more than OR, the supply of loanable

funds would exceed their demand, as a result, the rate of interest would fall and come back to its original equilibrium level. Conversely, if the rate of interest falls below OR level, the demand for loanable funds would exceed their supply; as a result, the rate of interest would rise and reach the original equilibrium level at OR.

Criticism. The loanable funds theory is criticised on many counts, the important among these are as follows:

i)   The theory mis-specifies the various sources of supply and demand of loanable funds. All savings in the economy are not routed through the loan market. Sometimes, households and firms invest directly into physical assets. Similarly, all dishoarding of cash balance is not always used for lending purposes, a part of it may be spent directly by the dishoarders.

ii) The theory is based on the partial equilibrium analysis. The theory assumes that the rate of interest influences all macro-economic variables

such as investment, saving, prices, demand and supply of money, etc. But, in reality, the rate of interest itself is affected by these factors.

iii) The theory assumes the existence of a perfect and well-integrated financial market. But, in actual practice, a large number of financial transactions take place in imperfectly competitive and segmented markets.

iv) The theory tries to combine the real and monetary factors for the determination of interest, which is wrong. For example, real factor like investment refers to a flow, whereas monetary factor like liquidity refers to a stock. Combining of such inconsistent factors is highly illogical.

In a developing economy like India, determination of interest cannot always be left to market forces of demand and supply; for example, demand for loans in such sectors of the economy as agriculture is always very high, but, the supply is limited. In such circumstances, agriculture will be denied resources and it will not develop. Similarly, small-scale industries require funds for development. But if these industries are left to manage the resources for themselves they will never be in a position to develop. Hence, the Government arranges to supply credit to such sectors of the economy as agriculture, small enterprises, etc., at lower rates of interest in order to facilitate their development.

IS-LM Theory

The IS-LM model is a way to explain and distill the economic ideas put forth by John Maynard Keynes in the 1930s. The model was developed by the economist John Hicks in 1937, after Keynes published his magnum opus *The General Theory of Employment, Interest and Money* (1936).

The IS-LM model provides another way of looking at the determination of the level of short-run real gross domestic product (real GDP) in the economy.

The basis of the IS-LM model is an analysis of the money market and an analysis of the goods market, which together determine the equilibrium levels of interest rates and output in the economy, given prices

The IS-LM model appears as a graph that shows the intersection of goods and the money market. The IS stands for Investment and Savings. The LM stands for Liquidity and Money. On the vertical axis of the graph, 'r' represents the interest rate on government bonds. The IS-LM model attempts to explain a way to keep the economy in balance through an equilibrium of money supply versus interest rates.

The IS-LM is also sometimes called the Hicks-Hansen model.
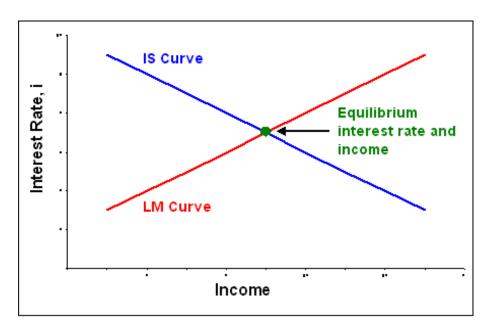
Figure 19.8: ISLM

Check Your Progress D

1   List three components of demand for loanable funds.

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2   State whether the following statements are **True** or **False**.

i)   In the classical theory of interest, saving varies directly with rate of interest.

ii)   In the classical theory of interest, investment varies inversely with the rate of interest.

iii) The rate of interest at which demand for loanable funds equals their supply, is natural rate of interest.

iv)   Money rate of interest and natural rate of interest can be at variance only. temporarily.

v)   According to Keynes, interest is a return on capital.

vi)   The classical economists were of the view that interest is a monetary phenomenon.

vii) The limitation of the classical theory of interest is that it ignores monetary factors.

viii) Keynes did not ignore the real factors like saving and investment in his theory of interest.

ix)   The correct theory of interest is one which takes note of both real and monetary factors.

19.6 LET US SUM UP

Wages are earnings of workers for the services they render in production. They are higher in those countries where productivity of labour is higher due to better endowments of natural resources and capital and superior technical know-how.

Labour markets can be competitive and non-competitive. When workers are not organized and employers are many, labour market is competitive. In such a labour market, wage rate is determined by the interaction of demand for and supply of labour, and is equal to its marginal revenue productivity. This wage rate need not always be equal to minimum subsistence level.

In reality, since there are a large varieties of job, requiring different types of labour, wage rates are also many. In some cases, these wage differentials can be explained in terms of nature of job, working life, training, social prestige etc. In other words, wages are different because there are non-competing groups of labour.

Presence of a trade union in a labour market makes it non-competitive. Workers join trade union with the hope that it can prevent their exploitation and secure a higher wage rate for them. Bargaining with employers through a trade union is known as collective bargaining. It often improves the capacity of workers to bargain with the employers. Generally, trade unions try to secure higher wages for their members by restricting the supply of labour, by forcing employers to raise the standard wage rate and creating conditions whereby the demand for labour increases. But a trade union is most relevant in the case of monopsony, that is, when there is one employer. Under monopsony, in the absence of a trade union the wage rate is lower than the marginal revenue productivity of labour and thus exploitation of labour is inevitable. A trade union in this case can successfully compel the employer to raise the wage rate to the level of marginal revenue productivity of labour and can thus eliminate exploitation.

Interest is the payment for the use of money. It performs a very useful function in the allocation of scarce funds. The merit of this method of funds allocation is that it leaves no scope for arbitrariness and it is always the most remunerative project that receives funds on priority basis.

In real life, at a point of time there can be a number of interest rates. The differences in these interest rates are mainly due to the differences in the risk element involved in different loans. Other factors which also contribute to interest rates differentials are costs and inconveniences associated with the handling of loans. Nominal rate of interest is the quoted rate of interest while the real rate of interest is a rate of interest adjusted for inflation. For major decisions, it is the latter that is more important.

For the classical and neo-classical economists interest is a return on capital. According to the classical economists, it is determined by the interaction of demand for and the supply of capital. The neo-classical economists consider monetary factors together with real factors viz., saving and investment to

explain determination of rate of interest. In their opinion, interest rate is determined by the demand for and supply of loanable funds. Having rejected this approach Keynes has argued that interest is a purely monetary phenomenon and is determined by the demand for and supply of money.

19.7 KEY WORDS

Collective Bargaining: Bargaining by workers jointly through some trade union.

Competitive Wages: Wage rate determined in a labour market where workers are too many and unorganized and the employers are also in large number and do not collude.

Loanable Funds: Funds which are available for lending purposes.

Money Wage: The amount of money paid to the workers by the employer for the services rendered by him in production.

Nominal Rate of Interest: The quoted rate of interest as a percentage return on the principal.

Non-competing Wages: Wage rates of labour groups among which there is no competition because each kind of labour is qualitatively different from the rest.

Non-competitive Wages: Wages determined in a labour market in which competition is non-existent either due to presence of a trade union and/or collusion among employers.

Real Wage: The amount of goods and services which a worker can obtain for his money wage plus the incidental benefits which he avails from the job.

Real Rate of Interest: A rate of interest which has been obtained after making adjustment for inflation.

Trade Union: An organization of workers to collectively bargain on their behalf with the employers.

19.8 ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

3   (i) False   (ii) True   (iii) False   (iv) False

    (v) True(vi)   False   (vii) True   (viii) True.

4   (i) Non-competitive (ii) Equalizing (iii) Positive (iv) Backward

    (v) Lower (vi) Competition (vii) Monopsonistic

Check your progress B

3   (i) True   (ii) False (iii) True (iv) False (vi) False

4   (i) Voluntary   (ii) Lower (iii) Monopsony (iv) Rightward

(v) Leftward (vi) Unemployment.

Check your progress C

3   (i) True (ii) False (iii) True (iv) True (v) False (vi) True

Check your progress D

2   (i) True (ii) True (iii) False (iv) True (v) False (vi) False (vii) True

3   (viii) False   (ix) True

19.9 TERMINAL QUESTIONS

1   Discuss the concepts of money wage and real wage. How are competitive wages determined?

2   How is it possible for trade unions to secure an increase in the wage rate through collective bargaining?

3   Distinguish between nominal and real rates of interest. Why are their interest rates differentials?

4   Is interest is a return on capital? How is interest rate determined?

5   Write note on Keynes' view of interest.

> **Note: These questions will help you to understand the unit better. Try to write answers for them but do not send your answers to the University. These are for your practice only.**

UNIT 20 DISTRIBUTION OF INCOME-II: RENT AND PROFIT

Structure

20.0 OBJECTIVES

After studying this unit, you should be able to:

- describe what is rent

- explain how rent arises

- distinguish rent from quasi-rent

- describe the concept of profits

- list the sources of profits.

20.1 INTRODUCTION

Production carried out with the help of various factors of production results in income that is shared among their owners as wages, interest, rent and profits. In the previous unit you have learnt as to how wages and interest are determined. In this unit you will learn about rent and profits. With respect to rent, you will study the nature of rent, how it arises and whether land alone or all the factors of production earn rent. In common usage rent is a return on land. But in economics, some economists consider it as a surplus earned by certain categories of land due to the fact that its supply is inelastic. Any factor having this quality of land can thus earn something which will be of the nature of rent. Some other economists assert that any income received by a factor over and above its opportunity cost will be rent. These are some complex issues and we shall explain them in this unit in detail. With respect to profit you will study its concept and the sources from which profits

emerge. Broadly, profit is the income of the entrepreneur. But why should an entrepreneur earn profit is a question on which there is little agreement among economists. You will learn in this unit that disagreement among economists on this question arises from the fact that profits earned by the entrepreneurs arise from more than one source and it is not always clear as to which one of these sources is the most important.

20.2 THEORY OF RENT

In economics, there are two main approaches to rent. The first one is the classical approach, according to which, rent is the return on land to the landlord. The chief exponent of this approach was David Ricardo. He defined rent as "that portion of the produce of the earth which is paid to the landlord for the original and indestructible powers of the soil." He thus gave a very restricted meaning to rent. His theory nonetheless revealed an essential truth that any factor fixed in supply will earn something of the nature of rent. This actually helped in developing the concept of quasi-rent.

Modern economists reject the Ricardian approach. They argue that rent does not accrue to land alone. In their opinion, it is a kind of surplus that accrues to all the factors of production.

Joan Robinson is considered to be the chief exponent of this approach.

She has stated, *"The essence of the conception of rent is the conception of surplus earned by a particular part of a factor of production over and above the minimum earnings necessary to induce it to do its work."*

This concept of rent is so much different from the common notion of rent that one finds it difficult to comprehend it. Yet it is this concept of rent which is now widely used in economics. Therefore, it would be worthwhile to follow it more carefully. Joan Robinson argues that each factor expects a certain minimum income as a return for the work it does in production. The actual earnings, however, may be equal to these minimum earnings or may be more than that. In case, they exceed the minimum earnings which the factor had expected, the surplus would be rent.

Having learnt the concept of rent, it is now easily possible for you to follow the theory of rent. In this section, we shall now dwell at length first on rent as a return on land, and then economic rent as a surplus over transfer earnings, which are the same as the minimum earnings necessary to induce a factor to remain in its existing use.

20.2.1 Ricardian Theory of Rent

As stated earlier in this section, Ricardo had viewed rent as a return on land. But, he was of the view that rent did not arise until only the most efficient land was under cultivation. However, once this land was exhausted and due to the increase in the demand for food grains, farming had to be extended to somewhat less fertile land, rent emerged on the most fertile land. The amount of rent in this case was to be equal to the value of the excess output on the most fertile land over that on the less fertile land. Further pressure of

population creating additional demand for food grains in course of time could exhaust even the supply of the second best land and thus still less fertile land was to be brought under cultivation. In this situation, rent not only increased on the most fertile land, but also emerged on the second best land. There was no rent on the least fertile land under cultivation. Ricardo called it the Marginal land.

Following this logic, if there are several types of land with different levels of fertility under cultivation, then rent will not occur only on the least fertile land, that is, on the marginal land. On all other types of land, rent will be paid equal to the value of their surplus output over that on the marginal land.

Suppose, there is a newly colonized country having land of three kinds, viz., A, B and C. Of these, A is the most fertile, B the second best and C the least fertile. Obviously people migrating to this country will cultivate land A first. The output of wheat that is possible on this land is 20 quintals per hectare by employing a certain amount of labour and capital which costs in money terms Rs. 4,000. The price of wheat is Rs. 200 per quintal. The total value of output of wheat is Rs. 4,000 which justcovers the cost of cultivation. Obviously, there is no surplus and, therefore, there is no rent on this land.

People will not cultivate land B or C until the demand for wheat can be met bycultivating land A. When demand for wheat increases due to an increase in population so much that it cannot be met by output on land A, some people will be left with no choice but to begin cultivation on land B. On this land with the same amount of labour and capital that farmers employed on land A, it is possible to produce only 16 quintals per hectare. This will raise the price of wheat to Rs. 250 per quintal. Now land B being the marginal land will be no rent land, and on land A rent will emerge and will be equal to money value of the surplus output over that on land B.

Since, the surplus output on land A over that on land B is 4 quintals and the price of wheat is Rs. 250 per quintal, the amount of rent on land A will be Rs. 1,000 per hectare. Likewise, when land C comes under cultivation, it becomes marginal land. If on land C the output of wheat per hectare is 10 quintals, the price of wheat will be Rs. 400 per quintal and the amount of rent on land A and land B will be the money values of the excess outputs on these lands over that on land C which are Rs. 4.000 and Rs. 2.400 respectively. Ricardo's concept of rent can be represented by a diagram (See Figure 20.1)
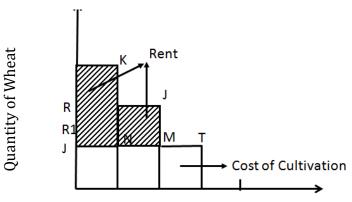

Figure 20.1: Rent on land as determined by Ricardo

On the X axis, we take various types of land A, B and C and on Y axis is given the output of wheat per hectare. The output on land A is represented by rectangle OK, on B land by rectangle PJ and on C land by rectangle LT. Since cost of cultivation is represented by rectangle ON or rectangle PM or LT, then C land is no rent land. Rent on A land is given by the shaded rectangle JK and on B land by shaded rectangle NJ.

Ricardo did not use any empirical evidence to propound his theory of rent. He relied entirely on deductive reasoning for this purpose and based his theory on certain assumptions. Briefly they are as follows:

1. The most efficient land both in terms of fertility and locational advantage was brought under cultivation first. Less efficient lands were cultivated later.

2. Scarcity is a unique quality of land and rent on land arise due to this quality.

3. Land is not homogeneous.

4. Land has certain original and indestructible powers which determine its quality in terms of fertility.

5. Marginal land is no rent land.

Evaluation of the theory

You can easily see that some of these assumptions are unrealistic. This was observed by various economists who criticized the Ricardian theory of rent for making questionable assumptions. It was said that Ricardo did not describe the order in which various types of land were cultivated correctly. Often less fertile barren land was cultivated first. Further, scarcity is not a unique quality of land. Other factors of production may also be scarce and can thus earn rent. Finally, no rent land is found nowhere and, therefore, it is wrong to say that the marginal land is no rent land.

20.2.2 Economic Rent and Transfer Earnings

In order to distinguish their concept of rent from rent in common usage the modern economists prefer to call it 'economic rent'. You have learnt earlier in this section that economic rent is a surplus that accrues to a factor of production over and above a minimum return that induces it to remain in its present use. This minimum payment to a factor of production is called transfer earnings.

If producer wants to employ a factor of production at a rate of payment lower than its transfer earnings, he will not succeed. In practice, the payment to a factor of production may be equal to its transfer earnings or may be even more than that. In case, the return to a factor of production is just equal to its transfer earnings, it does not earn any rent. However, quite often the remuneration to a factor of production is greater than 'its transfer earnings', and in all such cases a part of the earnings of the factor concerned is of the nature of rent and the other part is its transfer earnings. Thus, the actual

return to a factor of production normally contains both transfer earnings and rent.

> **Economic rent of a factor input = Actual earnings of a factor – Transfer earnings of the factor**

However, there are two limiting cases. In the first limiting case, the total earnings of the factor of production are transfer earnings. In the second limiting case, the entire payment to the factor of production is rent. You can follow this discussion easily with the help of the following illustrations.

1) First you can consider case of a person with a B.A. degree. Such a person is not trained for any specific job. He can do various kinds of jobs requiring no specific skill. Therefore, he can be a ticket collector in the railways, inspector in the revenue department or a clerk in some bank. Let us say, he is a clerk in a bank and gets Rs. 40,000 per month. Even as an inspector or a ticket collector he could get Rs. 40,000 per month. In this case, his transfer earnings are obviously Rs. 40,000 which he could get as an inspector in the revenue department or as ticket collector in railways and this is what he gets as his salary in his present employment. Therefore, there is no economic rent in his earnings.

> **First case**
>
> **Actual earnings –Transfer earnings = Economic Rent= Zero**

2) Let us now consider case of a person who is trained for a specific job such as dental surgery. This person cannot do any other job requiring special skill and will voluntarily not accept inferior jobs wanting no particular skill. Therefore, his transfer earnings are just nil and the entire salary amounting to Rs. 1,40,000 which he receives as a dental surgeon will be economic rent.

> **Second case**
>
> Actual earnings – zero (Transfer earnings) = Economic Rent

3) The two cases which we have discussed above are the limiting cases. In reality, rarely a factor of production is completely specific. Consider the case of a High Court Judge. Suppose, his salary is Rs. 1,50,000 per month. As an advocate this person could earn Rs. 80,000 per month. The transfer earnings of this person, therefore, are Rs. 80,000 per month, and in his monthly salary there is an economic rent of Rs. 70,000.

A careful consideration of the three examples will make it clear to you that economic rent is inversely related to the elasticity of supply of a factor of production. Let us first consider the case of a non-specific factor which gets the same return in all the possible uses to which it can be put. Obviously, the supply of such a factor will be perfectly elastic as shown in Figure 20.2. This implies that this factor is available only at a fixed price and if reward to it is even a little less than that, then not even one unit of it will be available to the producer. Moreover, the producer need not pay more to the factor because for him it is possible to get any quantity of the factor in question at the given price.

In Figure 20.2, RS is the supply curve showing that at OR factor price supply of the factor in question is perfectly elastic. The demand curve for the factor DD intersects it at E which means that the quantity of the factor employed is ON and the total earnings are OREN. In this case, since OR is the transfer earnings, the entire income earned by the factor is transfer earnings.
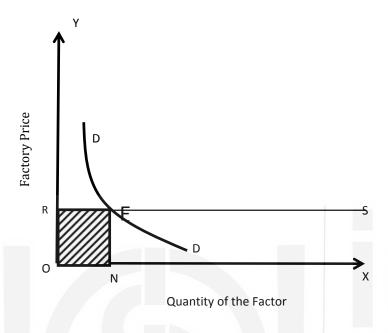
1) Perfectly elastic supply of factor

Figure 20.2: All the income of the factor is transfer earnings

2) Perfectly inelastic supply

Now consider the case of a factor which is completely specific. Its supply will be perfectly inelastic. The transfer earnings thus will be zero. This case is illustrated in Fig. 20.3
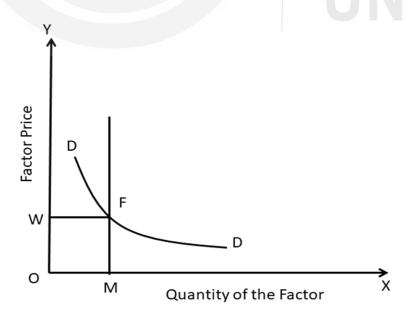

Figure 20.3 : All the income of the factor is an economic rent

You will observe that the factor price or the rate of return to the factor in this case is OW and the total earnings of the factor are OWFM. Since in this case, the transfer earnings of the factor are nil, the entire income earned by it is an economic rent.

In the case of elastic supply of a factor, the supply curve for it has a positive slope as shown in Figure 20.4. The demand curve for the factor DD intersects the supply curve TS at E and

Quantity of the Factor
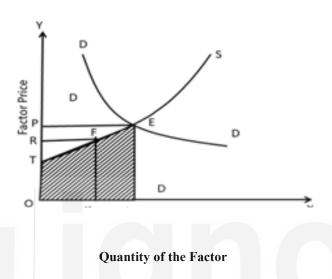
Figure 20.4: Earnings of the factor include both transfer earnings and economic rent

the equilibrium factor price is LE or OP. It would be clear to you that the last unit of the factor which is OL[th] unit gets the return equal to its supply price which is the same as its transfer earnings. Other units, of course, get something over and above their transfer earnings. For example, OK[th] unit's transfer earnings are KF or OR. Hence, its income contains an economic rent amounting to RP. Considering all the units of the factor together, the total income is OPEL. This includes transfer earnings of all the units amounting to OTEL, and thus the economic rent earned by all the units is TPE.

Check Your Progress A

1) What is the concept of rent in the classical economics?

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2) What is the concept of economic rent in modern economics?

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3) What is the concept of transfer earnings?

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....

....

4) State whether the following statements are **True** or **False.**

   i) According to Ricardo, rent is paid to landlord for the original and indestructible powers of the soil.

   ii) According to the modern economists, there is always an element of economic rentin the earnings of a factor of production.

   iii) Ricardo had asserted that the marginal land is no rent land.

   iv) The Ricardian theory of rent is based on the empirical evidence that was availableat the time the theory was propounded.

   v) In case, the supply of a factor of production is fixed, its entire income will be economic rent.

   vi) If the supply of a factor of production is perfectly elastic, its whole income will be economic rent.

20.3   QUASI RENT

The concept of quasi-rent was first used by Marshall in his famous work **Principles of Economics.** In his opinion, supply of factors of production like capital equipment can be inelastic in the short period and this enables them to earn a surplus over their supply prices. Obviously, this surplus is of the nature of rent. But, Marshall preferred to call it quasi-rent, because he was able to see the basic distinction between land and other factors of production, particularly the capital equipment and buildings.

The supply of land remains fixed in both short and long periods. Man by his skill and effort cannot increase its supply even in the long period. This is, however, not true of capital equipment. Its supply may be inelastic in the short period, but in the long period it can always be increased. Therefore, Marshall was of the view that machines, buildings and skilled labour could earn a surplus over their supply prices only in the short period. In the long period, in response to increased demand when the supplies of these factors increase, the surplus gets eliminated. Therefore, Marshall asserted that quasi-rent cannot be earned by any factor of production in the long period.

Economists now do not use the term quasi-rent exactly in the same sense as Marshall used it. The quasi-rent is now defined as the surplus which a producer gets in the short period over his variable costs from the sale of his product.

We can use an illustration to follow this concept. Let us suppose that an entrepreneur borrows some money from a development bank to buy a machine which he would use for making some commodity. The monthly interest that he pays to the development bank on the loan is the fixed cost that the producer incurs in any case irrespective of the size of production. The machine, however, is used along with variable factors, such as labour and raw materials. Although a producer undertakes production with the objective of earning profits, it is not necessary that in the short period he succeeds in achieving this objective. In the short period, there are four possibilities.

- First, that the price of his product not only covers that total cost but also enables him

- to earn some profits.

- Second, that the price of the product covers variable costs and only a part of the fixed

- cost, and as a result there are some losses to the producer.

- Third, that the price of the product is just enough to cover only the variable costs and

- thus the losses of the producer are equal to the amount of fixed cost.

- Fourth, the price of the product is not enough to cover even the variable costs.

Obviously, in the last case the producer will not undertake production. In the third case, he has an option. He may or may not undertake production, because whatever he may do, he will have to suffer losses equal to the fixed cost. In the first two cases, he will definitely undertake production, but while in the first case he earns some profits, in the second case he suffers some losses. In the second case, the producer does not have the option of not undertaking the production because if he does that his losses will increase and be equal to the fixed cost while in the event of undertaking production he manages to recover a part of the fixed cost.

It should now be clear to you that in the first two cases the producer receives a surplus over the variable costs and thus earns quasi-rent. In the third case in the event of production being undertaken, the producer fails to receive any quasi-rent.

In the long period all factors of production are variable and a producer will undertake production only if he can cover total costs. In earlier unit, you have learnt that under perfect competition, the price of the product in the long period is necessarily equal to both average total unit cost and marginal cost, and thus the question of anything of the nature of quasirent accruing to the producer does not arise.

You can easily follow the concept of quasi-rent with the help of Figure 20.5. In this figure, we have considered a case of a firm operating in a perfectly competitive market. SAC is its
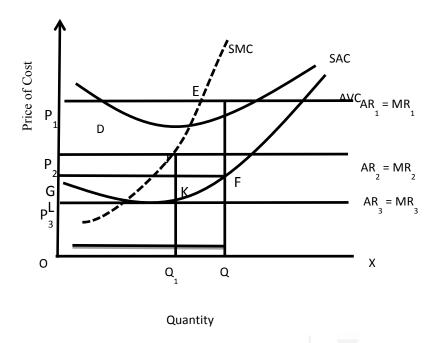
Figure 20.5 : Quasi-rent

short period average cost curve, AVC is the average variable cost curve and SMC is the short period marginal cost curve. Under perfect competition, since a firm is a price-taker, implying that it cannot influence the price, its demand curve is a horizontal.

Let us assume, that the price of the commodity produced by the firm is OP_1. At this price, the demand curve faced by the firm, that is, its average revenue curve will be AR_1. You have learnt in earlier unit that when average revenue of a firm is constant, its marginal revenue will be the same as the average revenue and also be constant. Hence, in Figure 20.5 we have $AR_1 = MR_1$. You will observe in this figure that SMC and MR_1, intersect each other at point E, which means that the firm is in equilibrium in the short period when

its output is OQ_1. At this output level, the firm's total revenue is $OP_1 \times OQ_1$,

that is, OP_1, EQ_1, and the total variable cost is $OG \times OQ1$, that is, OGFQ.

Hence, the surplus of revenue over the variable costs is $GP_1 \times OQ_1$, that is

GP_1 EF. This is the amount of quasi-rent accruing to the firm at the commodity price OP_1. Since in this case the price of the commodity is higher than its short period average cost, the profits earned by the firm are also included in the quasi-rent.

Let us now consider the case of the price being lower than the firm's short period average cost. In Figure 20.5 OP_2 is the price that fails to cover short period average cost of the firm. At this price since average variable cost can be recovered, the firm undertakes the production, and output level achieved is OQ_2. You will observe that at this output level, the marginal revenue indicated by MR_2 is equal to the short run marginal cost of the firm. The firm earns quasi-rent amounting to LP_2JK, though it suffers a loss due to its failure

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to recover the whole of the fixed cost. Finally, we consider as to what happens if the price is OP₃. You will note that at this price only average variable cost is recovered and thus no amount of quasi-rent accrues to the firm. Any price lower than OP₃ will fail to induce the firm to undertake the production and is, therefore, not relevant from the point of view of the analysis of quasi-rent.

Check Your Progress B

1) Define the concept of the quasi-rent.

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2) State whether the following statements are True or False.

i) The quasi-rent accrues to the landlord.

ii) The quasi-rent emerges only in the short period.

i) The quasi-rent may or may not include the profits of the firm.

iv) The quasi-rent is surplus accruing to the firm over and above its short period marginal cost.

v) If the price of the product is equal to the average variable cost, the quasi-rent received by the firm is zero.

vi) The concept of quasi-rent was introduced in economic theory by David Ricardo.

vii) The surplus over its transfer earnings is the quasi-rent of the factor of production concerned.

viii) According to Marshall, the quasi-rent emerges in the short period due to the inelasticity of a factor's supply.

20.4 PROFITS

Profit is said to be the return to the entrepreneur for the functions performed by him in production. Generally, he performs two kinds of functions. First, he makes a plan for producing something and accordingly combines and organizes various factors of production. Second, he bears the risks involved in undertaking the production. While performing the first function, the role of the entrepreneur is more of an organizer in performing the latter function he really acts as an entrepreneur. Most economics believe that profits are earned by the entrepreneurs for rendering both the services. Some economists, however, do not subscribe to this view. In their opinion, the monopoly element present in both commodity and factor markets enables the so-called entrepreneurs to earn profits. On careful examination, you will discover that

none of the above stated viewpoints is entirely wrong. In fact, both the approaches to profits contain some truth and can be justifiably considered as complementary. Profits nonetheless remain one of the most controversial subject in economic theory and require detailed discussion. In this section, we shall concentrate on two aspects, viz., the concept of profits and the sources of profits.

20.4.1 Concept of Profits

The concept of profits is not easy to explain on account of much controversy about it. The best thing in such a situation that one can do is to discuss all those viewpoints which have got some acceptability.

First let us consider F.B. Hawley's viewpoint. In his opinion, profits are the returns to the entrepreneur for his risk bearing function in production. Other factors of production are paid for their services even before the product is sold in the market. Hence, they do not bear any risk. The entrepreneur who organizes the production bears the entire risk associated with his production. Hawley has identified broadly four types of risks. These are: (i) risks associated with the depreciation of the plant and machinery, (ii) their obsolescence due to technological change, (iii) marketability of the product, and (iv) the various unforeseen factors in the business.

F.H. Knight does not agree with Hawley. He distinguishes between risks which can be anticipated and risks which cannot be anticipated. The risks which can be anticipated are insurable and profit is not a reward for bearing such risks. Unexpected risks which in his opinion, are the uncertainties are non-insurable and profit is earned by the entrepreneur for bearing only them. Most economists now consider Knight's concept of profits more appropriate than that of Hawley.

J.B. Clark defines profit as a dynamic surplus. In his opinion, in a static society, the entrepreneur's role is reduced to that of the organizer who is paid wages rather than profits. Hence, profits cannot be expected to emerge in a static society. In a dynamic society, due to changes occurring in the size and composition of population, human wants, supply of capital, production techniques and forms of business organization, money value of the output is never equal to the costs of the factors of production other than enterprise. The firm in these changing conditions can always hope to earn a surplus which goes to the entrepreneur as his profit. However, the possibilities of getting losses cannot be ruled out altogether.

J.A. Schumpeter has argued that the entrepreneur plays a very positive role in production as an innovator. In his opinion, profit is a reward to the entrepreneur for making innovations. Schumpeter distinguishes an innovation from a scientific invention or a technological progress. In his opinion, an innovation implies adoption of a new technique in production, introduction of a new product, capturing new markets for the product securing control over an entirely new source of some important raw material and introducing a new organisational structure in the firm.

M. Kalecki and Joan Robinson totally disagree with the above-mentioned approaches. In their opinion, profit is a non-functional income and it emerges due to imperfections in the market, Perfect competition has perhaps never existed in any market and the presence of monopoly element in them enables an entrepreneur to earn profit. In fact, the amount of profit which any entrepreneur now earns depends to a great extent on the degree of monopoly power which he enjoys in the market.

DIFFERENT VIEWS OF PROFITS

PROFITS ARE A REMUNERATION FOR BEARING RISK—**F.B. HAWLEY**

PROFITS ARE A REMUNERATION FOR BEARING UNCERTAINTIES

F.H. KNIGHT

PROFIT IS A DYNAMIC SURPLUS

—J.B. CLARK

PROFITS ARE DERIVED FROM INNOVATIONS

—J.A. SCHUMPETER

PROFITS ARISE DUE TO IMPERFECTIONS IN MARKETS

—JOAN ROBINSON

20.4.2 Sources of Profits

Profits do not arise due to a single factor. It is commonly believed that the risk element associated with the production is the principal source of profits. This view is not correct because a careful analysis of the profits clearly reveals that apart from risk or uncertainty there are some other important factors which give rise to profits. Among these, the more important sources of profits are the innovations done by the entrepreneur, the monopoly power enjoyed by the firm and the exploitation of labour. We shall now discuss each one of them in detail.

1) **Risk and Uncertainty:** You have earlier learnt in this unit that a section of economists define profit as a reward for risk bearing. Many economists do not agree with this view. Nonetheless the fact remains that risk element associated with production is an important source of profit. Production involves various kinds of risks. For instance, it is difficult to anticipate with certainty the exact demand for the product. Tastes and fashions may change, and, therefore, buyers may lose interest in a particular product. There may be cost escalation due to rise in factor prices. The machine and plant may become obsolete and may require replacement. The government may levy a heavy excise duty or the protection that has been given to the industry may be withdrawn. These are the risks which no producer can avoid totally. In fact, these are the non-insurable risks and in any case have to be borne by the entrepreneur. In return he gets profit. However, the probability of loss due to these uncertainties can never be ruled out. If demand for a product can be predicted, costs of production are stable, technological changes are so slow that the problem of obsolescence is totally non-existent and the state policies in respect of taxation and protection do not change suddenly, then the services of entrepreneur will not be required and profit will not emerge.

   Prior to the industrial revolution, artisans and handicraft workers generally produced for the local market. The demand for any product rarely fluctuated and the costs were stable over time. The tools used by these workers remained unchanged for centuries. Further taxation on production of commodities was rare. Hence, there was little risk involved in production. This explains why the entire earnings of artisans and handicraft workers were wages and there was nothing of the nature of profit in them.

2) **Innovations:** Another source of profit is innovation. Schumpeter attributes occurrence of profit solely to the introduction of innovations either in the production process or the marketing of the product. One may not agree entirely with Schumpeter's viewpoints because all profits cannot be explained in terms of innovations. Nonetheless it cannot be denied that some profits are certainly the result of innovations made by the entrepreneurs. In fact, it is the lure of profit that often induces entrepreneurs to make innovations. As discussed earlier in this unit innovations are not to be confused for technological changes. Schumpeter has used this concept in a wider sense.

He observed that this concept covered the following five cases: (1) the introduction of a new good, (2) the introduction of a new method of production, (3) the opening of a new market, (4) the conquest of the new source of the supply of raw materials, or half-manufactured goods, (5) the carrying out of the new organization of any industry, like the creation of a monopoly position.

Profits resulting from a particular innovation are essentially transitional. They are eliminated in course of time by the attempts of other firms to share them. An entrepreneur can hope to earn profits which arise from his innovating activity so long as other firms fail to retaliate. But in modern times, an entrepreneur cannot hope that other firms will not know his secrets. They will definitely eliminate the initial advantage which the entrepreneur had while making some innovation. Therefore, innovating activity has to be carried out continually if profits are to be earned on a regular basis from it. However, it has been observed that sometimes profits accrue from particular innovations for a considerable time either due to the ignorance of other firms of their existence or because of time that new firms would need to enter the industry.

3) **Monopoly Power:** A third source of entrepreneur's profit is the monopoly power enjoyed in the market. You have learnt in Block 4 which deals with the theory of price that perfect competition is a hypothetical situation and does not exist anywhere. Even if it is admitted that there may be some markets which are perfectly competitive, one should be clear that in such a market only normal profit is earned which truly speaking is nothing but wages for the managerial work done by the producer. M. Kalecki and many others assert that the source of real profit is the monopoly power that an entrepreneur enjoys in the market. This implies that greater the monopoly power that an entrepreneur can exercise, larger will be the amount of profit that accrues to him. A.P. Lerner has provided a quantitative measure for estimating the degree of monopoly existing in a market. Although, perfect competition is to be found nowhere, it can be considered an ideal situation due to total absence of monopoly element in it. Lerner having taken precisely this position argues that since under perfect competition price of a product is equal to its marginal cost, any deviation of price from the marginal cost shows that monopoly element is there in the market. The degree of monopoly, in his opinion, can be measured as follows:

Degree of Monopoly $= \dfrac{P-M}{P}$

Where,

P = Price

M = Marginal Cost.

The degree of monopoly, as Lerner measures it, is in fact reciprocal of elasticity of demand. This means that the degree of monopoly power which a firm enjoys in the market is inversely correlated with the elasticity of demand for a product. Lerner's measure of degree of monopoly, however, misses an important point. Apart from the elasticity of demand for the product, the other factor which has a great bearing on the monopoly power exercised by the firm is its share in the supply of the product.

In oligopolistic markets, for instance, there are generally a few firms of unequal sizes. A large firm accounting for a substantial portion of the supply of the product in such a case will emerge as a price leader and will make other firms to accept the price which maximizes its own profit. Other firms smaller in size and contributing much less to the supply of the product vis-a-vis the price leader will enjoy correspondingly less monopoly power, and thus their amount of profit will also be less.

4) **Exploitation of Labour:** Labour markets are never perfectly competitive. Quite often in these markets buyers of a particular type of labour power are very few. In some extreme cases, there may be just one firm desiring to employ a particular type of labour. In Unit 19, you have learnt that such a firm is known as a Monopsonistic firm. Under monopsony the wage rate is necessarily lower than the marginal revenue productivity of labour. According to Joan Robinson, the difference between the labor's marginal revenue productivity and the wage rate is the measure of workers' exploitation by the employer. It is, in fact, an illegitimate gain to the entrepreneur because it is not the result of any effort made by the entrepreneur. Nonetheless it emerges as one of the components of his profit.

The profit from this source is, however, reduced if workers resort to collective bargaining through trade unions. If a trade union is well organized and strong, it can force the employer to pay wages equivalent to the marginal revenue productivity of labour. In that case, profit from this source will get eliminated. But for various reasons trade unions never succeed in getting legitimate wages for the workers. They succeed only in reducing the exploitation of workers. Often their attempts in these directions are frustrated by the governments and, therefore, exploitation of workers as a source of the capitalists' profit never dries up completely.

Check Your Progress C

1) State the concept of profit.

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2) What are the major sources of profit?

a) ………………………………………………………………………………

b) …………………..………………………………………………………

c) …………………..………………………………………………………

d) …………………..………………………………………………………

3) State whether the following statements are **True** or **False.**

i) The entire profit earned by an entrepreneur is due to his organizational efforts in production.

ii) A part of the profit, earned by the entrepreneur can be explained in terms of his risk bearing activity.

iii) According to F.H. Knight, profit is a reward to the entrepreneur for uncertainty bearing.

iv) Schumpeter has viewed profit as a dynamic surplus.

v) In a perfectly competitive market the normal profit earned by the entrepreneur is more of the nature of wages than real profit.

vi) Innovations done by the entrepreneur can explain his entire profit.

vii) In the absence of uncertainty, profits will not arise.

viii) Exploitation of workers is not a source of profits.

ix) Monopoly power exercised by the entrepreneur is linked a great deal with the elasticity of demand for his product.

x) Profit will not be earned by the entrepreneur under static conditions.

20.5 LET US SUM UP

There are two main approaches to rent: (1) The classical approach, and (2) The modern approach. The chief exponent of the classical approach is Ricardo, according to whom, rent is the return on land to the landlord for the original and indestructible powers of the soil. It did not arise so long as only the most fertile land was under cultivation. Only when pressure of population raising the demand for food grains compelled people to cultivate relatively less fertile land, rent emerged on more fertile lands and was equal to the money value of the excess output on these lands over the output on the marginal land. Marginal land remained no rent land. Ricardo's theory of rent is based on highly questionable assumptions and is, therefore, not acceptable to the modern economists. In order to distinguish their concept of rent from rent in common usage, the modern economists call it economic rent. In their

opinion, rent is a surplus that accrues to a factor of production over its transfer earnings. Transfer earnings refer to that return to a factor which will induce it to remain in its existing employment. Joan Robinson, who is the chief exponent of the modern approach to rent asserts that it is not specific to land. In other words, rent can be earned by all factors of production. It depends on the elasticity of supply of a factor of production and is in fact inversely related to it. This implies that in case of supply of a factor being perfectly elastic, its total earnings will be transfer earnings, and in the opposite case when the supply is perfectly inelastic, the total earnings of the factor will be rent.

The term quasi-rent was first used by Marshall. In his opinion, supply of a factor of production like capital equipment could be inelastic in the short period and thus it could earn more than its supply price. The excess return to a factor of production over its supply price in the short period was designated as quasi-rent by Marshall. The concept of quasi-rent in the modern economics is somewhat different. Now quasi-rent refers to the surplus that a producer gets in the short period over his variable costs from the sale of his product. Since in the long period all factors of production are variable and the price tends to be equal to average cost, the quasi-rent does not arise.

Profit is the return to the entrepreneur for his services in production. But what exactly these services are, on this question economist do not seem to be in agreement. Hawley viewed profit as a reward for risk bearing. Knight distinguishing between insurable risks and non-insurable risks argued that profit is the reward for bearing the non-insurable risks which he called uncertainties. For J.B. Clark profit is a dynamic surplus. Schumpeter has viewed profit as a return to the entrepreneur for his innovating activity. These concepts of profit are not entirely contradictory. They are in fact overlapping and complementary.

Among the sources of profit, the more important ones are risks and uncertainties which any producer faces in the production and the marketing of the product, the innovations made by him, the monopoly power that he exercises in the market and the exploitation of labour. In a dynamic society demand may change, costs may escalate, the machines may become obsolete, tax burden may increase and the protection given by the State to the industry may be withdrawn. These uncertainties are always there and no entrepreneur can avoid them. However, he is rewarded in the form of profit for bearing them. Some profits are the result of Innovation made by him. Innovations involve the introduction of a new good and the adoption of a new method of production, the opening of a new market, the conquest of a new source of the supply of raw materials and the introduction of a new organization in the firm. Further each firm enjoys some degree of monopoly power and it contributes to its profits. The monopoly power of a firm is inversely related to the elasticity of demand for the Finally, due to imperfections in the labour market wages paid to the workers are lower than their marginal revenue productivity. The exploitation of labour in this form by the capitalist contributes to his profits.

20.6 KEY WORDS

Dynamic Surplus: Surplus accruing to the entrepreneur due to economic and technological changes.

Exploitation: The amount by which wage rate is less than the marginal revenue productivity of labour.

Economic Rent: The surplus over transfer earnings of a factor of production.

Innovation: Introduction of a new commodity, adoption of a new technique of production, opening of a new market, finding a source of raw material and introduction of a new organisational system in the firm or industry.

Marginal Land: The least efficient land under cultivation that is able to cover only the cost of cultivation.

Monopoly Power: Power of the monopolist reflected in the form of control over the supply.

Non-specific Factor: A factor of production which can be used for various purposes.

Profit: Return to enterprise.

Quasi-Rent: Surplus over the variable costs accruing to the firm in the short period.

Rent: Part of the produce to the landlord for the use of land.

Risk: Possibility of suffering a loss.

Specific Factor: A factor of production which can be used only for a particular purpose.

Transfer Earnings: The minimum earnings that induce a factor of production to remain in its existing use.

Uncertainties: Risks which are of non-insurable nature.

20.7 ANSWERS TO CHECK YOUR PROGRESS

Check your progress A

4   i) True ii) False iii) True iv) False v) True vi) False

Check your progress B

2   i) False ii) True iii) True iv) False v) True vi) False vii) False viii) True

Check your progress C

3   i) False ii) True iii) True iv) False v) True vi) False vii) True viii) False
     ix) True X) True

20.8 TERMINAL QUESTIONS

1) What is the concept of rent? Can rent be earned by factors other than land?

2) Discuss the Ricardian theory of rent. What are its assumption?

3) Explain the concept of transfer earnings. How is it related to rent?

4) Discuss the concept of quasi-rent. How does it differ from the concept of economic rent?

5) Explain the concept of profit. Do you think that profit is a reward for uncertainty bearing?

6 What are the various sources of profits? Do you think that all profits can be explained   in terms of the monopoly power exercised by the producer?

Note: The questions will help you to understand the unit better. Try to write answers for them, but do not send your answers to the University. These are for your practice only.

SOME USEFUL BOOKS

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